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ORGAN OF THE AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE
AND THE JOHNS HOPKINS INSTITUTE OF THE HISTORY OF MEDICINE

Editor—HENRY E. SIGERIST
Associate Editor—GENEVIEVE MILLER

VOLUME XXI

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PREFACE TO VOLUME XXI

After having published 20 volumes of this Bulletin in 14 years, we are once more faced with the necessity of making some changes in our policy. In 1939 the Bulletin became the joint organ of the American Association of the History of Medicine and of the Johns Hopkins Institute of the History of Medicine. The agreement between the two institutions foresaw that the Bulletin should have at least 500 pages every year. Actually we published 1212 pages in 1939, 1452 in 1940, and from 1941 on the Bulletin was issued annually in two volumes of five numbers each.

Wartime regulations required us to reduce the total weight of paper used for the journal by 20 per cent. We did it by using lighter paper, by reducing the edition and by cutting down margins adding 75 words to the page. Volumes thus became thinner and less impressive but, as a matter of fact, we published just as much copy as in the past, if not more.

The new situation that we now face is the result of the steadily increasing cost of production while the funds available to the Insti-

tute for publication are decreasing just as fast. Although the Bulletin did not lose subscribers during the war but, on the contrary, could register a certain gain, yet it was always published at a deficit which could be absorbed by the Institute as long as it did not exceed certain limits. It is obvious, however, that we cannot burden the Institute's work with a growing publication deficit and so we have to act now and propose to remedy the situation by making the following changes:

Beginning with January 1947, the Bulletin will be published as a bi-monthly periodical. Instead of 10 we shall issue 6 numbers a year, 2 of which will contain the Transactions of the Annual Meeting of the Association. The individual numbers will have from 130 to 150 pages; the volume, therefore, approximately 800-900 pages. There will be one volume a year instead of two but the members of the Association will still receive much more than the 500 pages promised to them. We shall also try to improve the physical appearance of the journal. The reduced margins of the war years were offensive to the eye even without comparing our standards with those of the Renaissance.

With all these measures we expect to reduce our annual deficit by at least $1,500, and while it is much more pleasant to build a journal up than to cut it down, yet I think that the changes will have some other advantages. They will simplify the editors' work which during the past year had to be carried out without any secretarial help. It will also permit us to be stricter in the acceptance of manuscripts, so that we may be able to produce a " smaller and better " journal.

We also feel that at present we may reduce the size of the Bulletin without causing any harm to the field of medical history. As long as we were practically the only periodical devoted to the subject in the entire English-speaking world we were forced to expand, and no sacrifice could be too great to provide researchers with an outlet for their work. Now that we have an excellent second periodical in the United States, the *Journal of the History of Medicine and Allied Sciences*, so ably edited by George Rosen, and that the launching of a British journal is being considered in England, the publication of the

Bulletin is not as vitally important as it used to be and we may well be permitted to reduce our losses by cutting down on its size.

The Index to Volumes I-XX is in preparation and will be sent to all present subscribers, members of the Association and others as soon as it is ready. We cannot foretell exactly when this will be, because here too we are working with hardly any help.

The present number shows that the general character of the Bulletin has not changed and every effort shall be made in the future, as it was made in the past, to maintain and improve standards.

A word remains to be said about our policy concerning book reviews. We had several unpleasant experiences during the past year which show that our present policy is not always understood. Everybody knows that the number of competent medical historians is small and consequently books dealing with subjects of medical history are frequently reviewed in medical journals by doctors who had neither training nor experience in historical research. Having no critical judgment, the reviewers usually are satisfied with giving an outline of the content of a book and in order to be on the safe side, they praise it in general terms. Thus it may happen that books which in any other field of history would never get into print not only find a publisher but can boast of any number of favorable reviews. Honest criticism, however, is needed if medical history is to be taken as seriously as other historical disciplines. This is why in 1943 we began to publish critical book reviews. For the last four years we have carried on with this difficult and thankless task, and we are deeply grateful to the colleagues who have taken the time and trouble to write reviews for us and who have not been afraid to incur the wrath of authors who cannot stand criticism.

Our policy is simple and clear. We want honest, critical, and constructive reviews, and when we receive a book we send it to the most competent individual available. It often happens that a scholar who is best qualified to give a critical opinion on a book is not available because he has not the time or for some other reason, but in every case we make an effort to find a reviewer who knows the

subject and is willing to devote time and labor to the task. Reviewers have complete freedom and are given as much space as they desire. All reviews are signed and opinions expressed are those of the reviewers and not of the editors. We have made mistakes occasionally in the selection of reviewers but we feel that the book review section, as a whole, has been competent and is fulfilling its function, one that is badly needed in a historical discipline that is still groping for recognition.

THE EDITORS

NATIONALISM AND INTERNATIONALISM IN MEDICINE *

HENRY E. SIGERIST

Ladies and Gentlemen,

I feel greatly honored to have been invited to address the oldest medical society of colored physicians established in this country, although I deeply deplore that you were forced to create your own organization instead of being able to join hands with the white doctors of the capital in the common fight against disease. In no country is there more talk about democracy than in ours and no country is more eager to educate other nations in the principles of democracy, but when it comes to the practice of these principles at home we are sadly deficient and tolerate discrimination against fellow citizens on racial or religious grounds.

It is an honor to deliver a lecture named after a courageous man, Senator Charles Sumner of Massachusetts, who after the Civil War when three qualified Negro physicians were refused admission to the medical society of the capital did everything in his power to have enacted whatever legislation might "be necessary in order to secure for medical practitioners in the District of Columbia equal rights and opportunities without distinction of color." He was defeated but his name lives on and is remembered as that of a courageous man who not only talked about democracy but practised it.

The subject of my lecture has some relation to the problems that you have been facing all these years, because nationalism is also a form of human conceit and intolerance that is poisoning the world and defeating democracy. After two World Wars we are particularly aware of it, but its evil effect was felt long ago. In 1902, on the occasion of a meeting of the Canadian Medical Association in Mon-

* The Second Annual Charles Sumner Lecture of the Medico-Chirurgical Society of the District of Columbia, delivered at Washington, D. C., on May 23, 1946. The lecture was repeated in somewhat enlarged form to the Association of Internes and Medical Students at the Johns Hopkins Medical School on December 12, 1946.

treal, William Osler delivered one of his classical addresses on the subject of " Chauvinism in Medicine " in which he said:

> Nationalism has been the great curse of humanity. In no other shape has the Demon of Ignorance assumed more hideous proportions; to no other obsession do we yield ourselves more readily . . . it rages today as of yore in spite of the precepts of religion and the practice of democracy. Nor is there any hope of change; the pulpit is dumb, the press fans the flames, literature panders to it and the people love to have it so.

In this address Osler turned his wrath on nationalism, provincialism, parochialism in medicine and castigated such absurdities as that of having different licenses in every state within one commonwealth. Almost half a century has elapsed since Osler gave his address, and if he could be with us today he would soon find that his most pessimistic predictions have become true, and that conditions are infinitely worse today than they were in the beginning of the century.

We have just emerged from an orgy of nationalism which almost wrecked the world. In many countries, fascism brought nationalistic feelings to the boiling point and distorted the sentiments of an entire generation. For over twenty years it was hammered into Italian youth that its mission was to restore the Roman empire in all its former grandeur. German youth was taught that it must conquer the world for the superior Nordic race—whatever that may be—and thereby redeem the world. And Japan being the most highly industrialized Asiatic country felt predestined to rule the entire Far East. Millions of young people were trained for war and marched in black shirts and brown shirts, waving flags and banners, uttering savage cries of *Eia, Heil, Banzai*. And numerous satellites circled in the orbit of the large fascist powers mimicking their antics.

The trouble is that many people cannot distinguish between patriotism and nationalism. It is obvious that every sane and decent individual loves his country, that he is deeply attached to it, ready to serve and to defend it. He is proud of his country's achievements, in the past and in the present, and is strongly aware of the obligation imposed upon him by a great tradition. But the true patriot is also critical of his country, aware of its weaknesses, eager to cooperate in bettering its institutions. No country is perfect, and it is the duty of all patriotic citizens to work relentlessly so as to

improve conditions steadily. Whoever truly loves his own country is tolerant of other nations and realizes and admits that they too have made contributions to civilization and progress. He may even find that some foreign country has solved certain problems better than his own and that he may well benefit by studying the foreign experiences. And even when he emotionally dislikes certain foreign ways, he remains tolerant and respects them as long as they are not a menace to the security of his country.

The nationalist is different. He also loves his country but he is blind, ignorant, conceited and intolerant. He believes that his country is the only one that has ever made any contributions to civilization and ignores or at least minimizes the part played by other nations. He is convinced that the race, or tribe or whatever the group to which he belongs may be, is superior to all others, that whatever he does is good and noble and great, while what the neighbor does is bad and vile. He is oriented toward the past, glorifies it beyond measure in order to conceal his own inanity. Real achievements of his ancestors do not make him humble but boastful. Being utterly uncritical of his own country and unprepared to improve it, he becomes an easy prey of adventurers who flatter and exploit his nationalistic feelings. His boastful exaggerations frequently make a laughing-stock of his country. A much advertized millennium that lasts only twelve years is not tragic but ridiculous. But nationalists must be taken very seriously because they are a menace to the world. Their ignorance and intolerance makes them aggressive, and they are only too inclined to attack their neighbors in order to make them subservient to their own purposes and in order to force their way of life, the only correct one as they believe, upon others.

How can nationalism affect medicine, a human activity that seems international if there ever was one? A pneumonia is the same biological process whether it takes place in an American, an Italian or a Chinese. A broken leg is a broken leg whether the skin that covers it is white, black, or yellow. Are treatments not basically the same wherever modern, scientific medicine has been accepted? In medical institutions, hospitals, laboratories and schools all over the world, we find commemorated on the walls the name of our common ancestors from Hippocrates to Pasteur and beyond. All countries

are represented. They all have contributed their share to the progress of medicine.

Indeed, there was a time when medicine was international. It was truly international for many centuries. Greek medicine was the medicine of the entire Mediterranean world for over one thousand years. It evolved a great deal in the course of time and was by no means uniform. The Corpus Hippocraticum, that unique collection of medical books, was written in the same language, Ionian Greek, but contained treatises from different schools. There was disagreement and competition between the schools of Cos, Cnidos, Croton, Sicily, but their medicine was practised all over the Greek territory and not only locally. The fact that most Hippocratic physicians were itinerant practitioners, guaranteed the spreading of doctrines and techniques.

The international character of Greek medicine became still more outspoken in the Hellenistic period. Alexandria was not only a commercial metropolis but a great center of studies that attracted scientists and scholars from all over the Greek world and to which students flocked until the time of the Arabic conquest. The classics of medicine were collected and edited and acquired the form in which they have come down to us. Medical books were written in Greek and continued to be written in that language all through the Roman period with the exception of books for the layman like the section on medicine in the Encyclopedia of Aulus Cornelius Celsus.

A change took place when the Roman Empire disintegrated in the period that we commonly designate as the early Middle Ages. Greek was gradually replaced by Latin in Western Europe. Latin was the language of the administration and of the courts. It was the language of the Western Church and the vernacular language of Italy, Spain and the Gauls. Greek medical books were translated into Latin while new books were written in it directly. The Church was the strongest cultural force in Western Europe, and throughout the Middle Ages medicine, science, and learning were international all through the West.

Conditions were very similar in the East where the religion of Mohammed had created a strong bond that united the nations from Spain through North Africa into Asia as far as India. Arabic was

not only the language of the Koran but also the language of science, and medical books could be read and studied all over the Islamic world, whether they had been written in Spain, Morocco, Egypt, Syria, or Persia. Thus for more than a thousand years, two systems of medicine, both international in character, dominated large sections of the world. They were different in language and in the underlying religion but very similar in character, because they both built upon the same foundation of Greek medicine. The intercourse between East and West was a very intimate one, particularly at the time of the Crusades when the two worlds clashed in the Near East. Arabic books were translated into Latin, and the great classics of Islamic medicine, Rhazes and Avicenna, became Western classics as well who ranked next to Hippocrates and Galen. The ways parted at the time of the Renaissance when a new medical science based upon the foundation of anatomy began to develop in the West, while the East continued to follow traditional lines. Mediaeval medicine is still practised in large sections of the Orient, and a highly popular school of indigenous medicine in India calls itself Unani, which means Greek, but it actually is the old Graeco-Arabic medicine.

The university that developed as a center of learning in the West during the Middle Ages was a highly international institution, a free association of teachers and students from many lands. The early university had no property; all it possessed was a charter, and professors and students felt free to move from one country to another if they found conditions unsatisfactory. Thus a group from Paris crossed the channel to England and settled down at Oxford. Students from Bologna moved north and founded the University of Padua. Students and teachers from Prague decided to continue their work at Leipzig and became the nucleus of that famous university. No student was refused on account of his nationality. They were all Christians, had in Latin a common language of learning. All universities had similar institutions and degrees were recognized all over the Western world.

This international character of medicine persisted throughout the Renaissance. The great anatomist, Andreas Vesalius, was born at Brussels, educated in Louvain, studied medicine in Paris, graduated at Padua where he became Professor of Surgery and Anatomy, pub-

lished his great book in Switzerland at Basel, joined the Imperial Court in Spain and The Netherlands, went on a pilgrimage to the Holy Land, and died on a Greek island. Such a career was by no meant unusual, and it is well known how Paracelsus, another great Renaissance physician, spent most of his life travelling from one country to another all through Europe and the Near East, and practised medicine while he was travelling.

The European university, science and medicine at large, maintained their international character to the end of the 18th century. At that time it was still possible for a medical student to begin his studies in one of the universities of his native land, then to proceed to Paris, Leipzig, Padua or Salamanca, wherever there were professors with whom he wanted to study. The Swiss physiologist and universal naturalist, Albrecht von Haller (1728-1777) attended the schools of his home town, Berne, studied medicine at Tübingen in Germany and Leiden in Holland where he graduated. He then went on a study tour through Holland, England and France, did postgraduate work at the University of Basel, started out in practice in his native Berne, from where he was called to the newly founded University of Göttingen as professor of anatomy, surgery and botany at the age of 28. Haller was in correspondence with the entire scientific world of the time, and the letters written to him fill many volumes that are carefully preserved at the University Library of Berne. Even when he wrote to his most intimate friend, Johannes Gessner in Zurich, he used the Latin language. It was the universal means of communication between scholars and scientists, and whether a book was published in Sweden, Holland or Spain it could be read immediately by the scientists of the world.

Science was not a war weapon in those days, and it was generally accepted that the brotherhood of scientists extended beyond national borders and should be maintained at all costs, even in times of war. The original charter granted to the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge explicitly foresaw:

> That it shall and may be lawful for the said Society by their proper officers, at all times, whether in peace or war, to correspond with learned Societies, as well as individual learned men, of any nation or country, upon

matters merely belonging to the business of the said Society, such as the mutual communication of their discoveries and proceedings in Philosophy and Science; the procuring books, apparatus, natural curiosities, and such other articles and intelligence as are usually exchanged between learned bodies, for furthering their common pursuits; Provided always, That such correspondence of the said Society be at all times open to the inspection of the Supreme Executive Council of this Commonwealth.

When Jenner's vaccination was being tested in England, Woodville, one of the early vaccinators, was anxious to have the opinion of his French colleagues. But France and England were at war in 1800. Nevertheless, diplomatic steps were undertaken; Talleyrand, the French Minister of Foreign Affairs, issued special passes and permits. In May 1800 vaccine was sent from England to Paris and in July of the same year, Woodville came in person, was received as an honored guest, and performed vaccinations on French children in Boulogne and Paris.

When Latin died as international language, it was replaced to a certain extent by French. The Prussian Academy of Science, as well as the Russian Academy, published their Memoirs in French. French was the language of the nobility and hence also of diplomacy. No interpreters were needed at the Congress of Vienna because the diplomats had one common tongue in which they could negotiate.

When the remnants of feudalism were overthrown by the French Revolution and the middle class came into power, the need was strongly felt for a new type of university. Latin was abolished as the language of instruction. Old academic rites that had lost their meaning were abandoned, new curricula were devised and the universities were not merely centers of teaching but also of scientific research with libraries, laboratories, and clinics. The universities played a decisive part in the great development of science that took place during the 19th and 20th centuries, but they were no longer the international centers that they had been in the Middle Ages. National schools of medicine developed. The centers shifted. The French school dominated the first half of the 19th century and was succeeded by the German school which developed the laboratory methods of medicine. In the United States, medical conditions were chaotic before the Civil War, but after the War a reorganization

took place. New standards were set by the States, and since the schools could not be trusted as yet, students had to take state board examinations that gave them a license to practise. New medical societies were founded which took an active part in the reorganization of medical education and practice. New schools were organized such as the Johns Hopkins School of Medicine with new curricula that combined the best features of foreign medical education and blended them into a new, very promising pattern. With its immense resources, the United States was able to carry on medical research on a large scale, and while American students in the past were forced to go abroad for specialized instruction, today foreign doctors are coming to the States in increasing number for post-graduate training.

Russia, before the Revolution of 1917, could pride herself on a number of very distinguished medical scientists, clinicians, psychiatrists, and particularly physiologists. The Oldenburg Institute of Experimental Medicine of which Pavlov was the driving spirit had a world reputation. The reorganization of medicine after the Revolution, the great emphasis placed on science, on scientific research by the Soviet State have resulted in the creation of a large number of research institutions well-staffed and lavishly supported from which important results have already come and many more may be expected.

Medicine, as we have seen, developed along national lines, and while spectacular discoveries became known immediately, yet the difference between the schools of the various countries remained considerable. The difficulty of understanding one another was greatly increased. Medical journals were founded in growing number but could be read only by those who happened to know the language. When a scientist made a discovery in the 18th century, he did not publish it immediately but described it in a letter written in Latin that was sent to some friends abroad. They, in turn, would discuss these letters with their students and colleagues, would repeat the experiments described and report what their experience had been. After a discovery had been tested in such a way, it might then be published, either in a monograph or in the transactions of an academy. In the 19th century and in the 20th century still more, the ease with which a paper could be published made it very tempting

to announce an observation or the result of an experiment before they even had been tested. Medical literature increased in a terrifying way, and at the same time the literature was accessible only to the doctors who understood the language. When the Johns Hopkins School of Medicine was opened in 1893, knowledge of Latin, French, and German were entrance requirements. The older generation knew these languages, while today Latin has been waived as a requirement and a very few of our students know French and German sufficiently well to read a medical text fluently.

The difficulty of understanding one another across national borders called for the organization of international societies of medicine and of the various specialties. International conventions were held that brought physicians of various countries together, but the language barrier remained and with growing nationalistic feelings these conventions were frequently a battleground on which national feuds and personal ambitions were fought out.

In one field of medicine international cooperation was imperative and could not be suppressed even in the most nationalistic periods of our modern history, namely in the field of public health. Communicable diseases do not respect national boundaries nor class barriers, and as soon as people had a clear concept of the contagiousness of certain diseases, measures were taken by governments to protect their nations against the introduction of these diseases. The Black Death that ravaged the world in the 14th century was a lesson that nobody could forget, and soon thereafter, in 1377, the city council of Ragusa ordered that all travellers coming from plague-ridden countries should be barred from the city unless they had spent one month on the island Mercana *ad purgandum*. Venice followed the example and so did gradually one port after another. From 1664 on, England required a bill of health from every ship that came from Turkey and Egypt. Medical intelligence became a duty of diplomatic agents. Milan kept special agents north of the St. Gotthard to examine travellers and report about them.

The Asiatic cholera that hit the western world several times in the course of the 19th century stirred up public opinion still more. An international conference was called in Paris in 1851 with the purpose of organizing maritime quarantine on an international basis.

This first conference failed in its attempt to create a permanent international health organization, but the idea remained in the air. Further international health conferences were held in Paris and other cities. In 1881 the Washington conference made yellow fever its special target and created a system of international notification of the disease. Finally, in 1909, the Office International d'Hygiène Publique was founded in Paris as a clearing house of medical intelligence. It had a permanent committee and delegates from 54 nations.

The Suez Canal was opened in 1869, and since plague, cholera, and other epidemic diseases had attacked Europe from the East, it seemed logical to make the Canal a filter through which diseases would not be permitted to enter the Mediterranean basin. Egypt became the quarantine outpost of Europe. In 1892 the Sanitary Maritime and Quarantine Board of Egypt was established.

In the Western hemisphere, ever since the International Sanitary Conference of Washington of 1881, the plan of an office that would prevent the spreading of communicable diseases in the hemisphere and would serve as a center of medical intelligence, was considered. It was realized in 1902 when the Pan American Sanitary Bureau was organized with offices at Washington.

Another international organization was an offshot of the wars that had taken place in the middle of the 19th century. War, the reversal into primitive savagery, was greatly resented in the 19th century at a time when humanitarian feelings had become very strong. Attempts were made to mitigate at least the horrors of war. Henri Dunant's *Souvenirs de Solférino* published in 1862, stirred the conscience of the world; in 1864 the Red Cross Covenant was accepted, and one country after another founded Red Cross societies.

A new step was taken when the League of Nations began to function in 1920. Article 23 of the Covenant made it the duty of the League "to endeavor to take steps in matters of international concern for the prevention and control of disease." A health organization was founded as a section of the Secretariat of the League, and I think everybody will agree that this was one of the best functioning branches of the League. It was obvious that the successor to the League, the United Nations, would feel its responsibility toward the people's health and on July 22, 1946 representatives of 61 nations

signed the Constitution of the new World Health Organization. Its objective is " the attainment by all peoples of the highest possible level of health," and the introductory paragraphs to the Constitution reflect a very broad attitude toward the problems of health and disease:

> Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.
>
> The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.
>
> The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest cooperation of individuals and States.
>
> The achievement of any State in the promotion and protection of health is of value to all.
>
> Unequal development in different countries in the promotion of health and control of disease, especially communicable disease, is a common danger.
>
> Healthy development of the child is of basic importance; the ability to live harmoniously in a changing total environment is essential to such development.
>
> The extension to all peoples of the benefits of medical, psychological, and related knowledge is essential to the fullest attainment of health.
>
> Informed opinion and active cooperation on the part of the public are of the utmost importance in the improvement of the health of the people.
>
> Governments have a responsibility for the health of their peoples which can be fulfilled only by the provision of adequate health and social measures.

Public health could not afford to indulge in narrow nationalism, but other branches of medicine did. Every country considered *its* medical standards to be the highest, *its* system of medical education the best, *its* way of presenting a paper the only correct one. The writing of medical history has been poisoned with nationalistic prejudices, every country claiming priority for discoveries, hunting for " firsts " and " fathers " of medical inventions. Yet history teaches us very clearly that discoveries are usually not made out of a blue sky, but that many brains and hands are needed until a new idea has been conceived or a discovery has been made and has been applied for the benefit of the people.

We in America are not exempt from nationalistic prejudices. We may be justly proud of the great progress achieved since the beginning of this century and of the many and great contributions that

American scientists have made to medicine, but we should remember that the sulfa drugs came to us from Germany, penicillin from England and D. D. T. from Switzerland. It would be foolish presumption to assume that Europe is finished. Many European countries have just gone through very difficult times, but the creative forces are still very powerful in Europe, and energies which were absorbed in the pursuit of sterile imperialistic ends may now be applied to creative purposes. It would be a great mistake for us to stop learning foreign languages and to ignore the work of other countries.

We should also remember that while we are ahead of other countries technically we are behind many of them socially, so that in this field we could learn a great deal from foreign experience. We probably have the best trained and best equipped dentists in the world, but the majority of all American people have no dental care. We still have to learn how medical science can be applied to all the people, irrespective of race, color or creed, irrespective of whether people are rich or poor and whether they live in cities or in rural districts.

Science and technology have developed tremendously in recent years but civilization has not kept pace with this development; on the contrary, we must admit that we are in many ways much more savage, brutal and intolerant than our ancestors were a few generations ago. Medicine is one field in which science is applied to a good end. While physicists and chemists live in constant fear that their discoveries will be used for the destruction of mankind, medical science so far has been used to prolong life and alleviate suffering. Even in the barbaric wars of our days the neutrality of medical personnel has been respected as a rule, and physicians have treated friend and foe without discrimination. Physicians, therefore, should be ambassadors of good will. In the medical field nationals of different countries meet on a neutral ground where understanding is easier. It is the duty of physicians to help in the promotion of understanding between nations and to combat nationalistic prejudices.

JOHN HUNTER, SIR THOMAS BROWNE AND THE EXPERIMENTAL METHOD

JANE M. OPPENHEIMER *

> Let thy Studies be free as thy Thoughts and Contemplations, but fly not only upon the wings of Imagination; joyn Sense unto Reason, and Experiment unto Speculation, and so give life unto Embryon Truths, and Verities yet in their Chaos.[1]

Probably the greatest interest that John Hunter holds for posterity is related to the fact of his own preoccupation with the experimental method: its application by him to the widest variety of biological problems signalized the beginning of modern experimental medicine as it is familiar to the twentieth century. The experimental method, in its purest form, had been introduced into medicine by William Harvey during the early seventeenth century: *De Motu Cordis* was published in 1628. John Hunter, who was the first investigator in Great Britain to prove the applicability of the method more generally to medicine, surgery, comparative anatomy and comparative physiology in their broadest aspects, was born exactly 100 years later, in 1728. The problem which we propose to examine to-night is why the time-lag between Harvey and Hunter was of so great duration as a century.

I shall take the liberty of trying to answer the question as to why John Hunter succeeded, by examining the attempts of another famous British natural historian and physician, closer to Harvey chronologically, who failed; namely, Sir Thomas Browne. I shall talk perhaps more about Sir Thomas than about Hunter, for which an apology is due to an audience who came presumably to hear about Hunter first and foremost. But here, as in history and in science, Hunter's influence is everywhere pervasive, whether explicitly obvious or no. and as ever he will emerge at the end as hero.

* Based on an address delivered at the Johns Hopkins Medical History Club, Baltimore, Md., Monday, January 27, 1947.

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[1] *The Works of Sir Thomas Browne*, edited in six volumes by Geoffrey Keynes, Faber & Gwyer, Faber & Faber, London, 1928-1931, I, 123.

Familiar as Sir Thomas is to many, I should like to lay stress on some aspects of his scientific outlook that may bear emphasis, especially, his attitude toward the experimental method. Sir Thomas Browne seems a quaint figure to modern physicians, and much of the great interest in his work has been in the past primarily literary or perhaps philosophical. As a fortunate result of his popularity on these planes, there has been preserved a large number of his writings, correspondence, miscellany and notebooks as well as his published books, and these furnish much pertinent information on the particular point in which we are interested.

His appreciation of the scientific method was often clearly expressed:—in his praise in the *Pseudodoxia* of "the definitive confirmator and test of things uncertain, that is, the sense of man;" [2] in his admonition to the reader of the *Christian Morals*, quoted above as a rubric, and lastly in his comments on Harvey himself, "that ocular Philosopher, and singular discloser of truth," [3] as he called him. "You may gett one in English and read it often," he wrote to his son Edward of the treatise *De Generatione Animalium*, "for it is an excellent peece and full of observations," [4] and in the *Pseudodoxia* he spoke of the same work as "that excellent discourse . . . So strongly erected upon the two great pillars of truth, experience and solid reason." [5]

What was the intellectual background of this man, that, classicist as he was, he could be so quick to appreciate the implications of Harvey's contribution? His education was an interesting one. Winchester School, familiar still as one of the great public schools of England, and Broadgates Hall, Oxford, later to become Pembroke College and Samuel Johnson's alma mater, first nurtured him. He found his way next to Montpellier, where a few generations previously Rondelet,[6] as a contemporary of Vesalius and like him and Servetus a student of Günther's, had carved out his dissections with his own hands and had induced Henri II to erect there the first anatomical amphitheatre for France. Browne may well have felt at

[2] *Ibid.*, II, 219. [3] *Ibid.*, II, 304. [4] *Ibid.*, VI, 68. [5] *Ibid.*, II, 304.

[6] Rondelet suffered the same posthumous fate as John Hunter, in that the bulk of his writings were lost to posterity. They were left to Laurent Joubert, his successor as Chancellor of Montpellier, for editing and publication, and were not heard of after.

Montpellier a strong breath of the intellectual Renaissance; and it may have been from a former Chancellor of Montpellier that he had his first inspiration for the *Pseudodoxia*, though he, to be sure, denied it:

> Dr. Primrose hath made a learned Discourse of vulgar Errors in Physick. . . . Laurentius Joubertus by the same Title led our expectation into thoughts of great relief; whereby notwithstanding we reaped no advantage, it answering scarce at all the promise of the inscription.[7]

From Montpellier he travelled to Padua, where Harvey—that stem of the rod of Vesalius and Fallopius and Fabricius—had learned before him; and thence to Leyden, where he took his degree of Doctor of Medicine. A respectable education, indeed, at its inception, compared to that of John Hunter, whose training derived almost solely from "the great volume of nature," [8] and at the end one that could not fail to stimulate a fertile mind.

That Browne profited directly from the teachings of the prophets of the new learning is manifest in a multitude of remarks in which he preached explicitly the doctrine that "sight is the best judge." [9] We shall quote here only those relating to anatomy and animal biology, as more directly in John Hunter's field, though Browne worked as well in many other areas of natural history.

> The first shall be of the Elephant, whereof there generally passeth an opinion it hath no joints; and this absurdity is seconded with another, that being unable to lie down, it sleepeth against a Tree; which the Hunters observing, do saw it almost asunder; whereon the Beast relying, by the fall of the Tree, falls also down it self, and is able to rise no more. . . .
>
> They forget or consult not experience, whereof not many years past, we have had the advantage in England, by an Elephant shewn in many parts thereof, not only in the posture of standing, but kneeling and lying down. . . . If . . . any shall affirm the joints of Elephants are differently framed from

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[7] *Ibid.*, II, 5.

[8] W. Wadd, *Nugae chirurgicae; or, a biographical miscellany, illustrative of a collection of professional portraits*, Nichols, London, 1824, p. 232. To the benefit of John Hunter, of whose manners such harsh words have been spoken, let it be emphasized that there is no line in his works that I should not happily read to this or any other audience. Not so for Sir Thomas: there are various obscenities in his writings.

[9] Browne, *op. cit.*, V, 316.

most of other quadrupedes . . . he doth herein no injury unto truth. But if . . . he affirmeth also they have no articulations at all, he incurs the controulment of reason, and cannot avoid the contradiction also of sense.[10]

That he made his own independent observations, as well as pleading with others to do so, is also abundantly clear from his writings. "When it first came into my garden," he wrote of an ostrich procured by his son Edward, presumably one of those brought by the "Embassadour of the King of Fez & Morocco"[11] to the King, and probably, as Sir Thomas said, "the first oestridge dissected in England, at least to any purpose":[12]

it soone eat up all the gilliflowers, Tulip leaves, & fed greedily upon what was green. . . .

When it tooke downe a large onyon it stuck awhile in the *Gula* & did not descend directly, butt wound backward behind the neck whereby I might perceave that the Gullett turned much, butt this is not peculiar unto the oestridge, butt the same hath been observed in the stork[13] when it swallowes downe froggs & prettie bigge bitts.

It made sometimes a strange noyse, had a very odde note especially in the morning & perhaps when hungry.

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[10] *Ibid.*, II, 179-183. [11] *Ibid.*, VI, 235. [12] *Ibid.*, VI, 242.

[13] Browne's observations, in the *Natural History of Norfolk*, on "a kind of stork . . . shott in the wing by the sea neere Hasburrowe," were followed by the remark: "I could not butt take notice of the conceit of some who looked upon it as an ill omen, saying if storks come over into England, pray God a commonwealth do not come after" (*ibid.*, V, 394), a comment which he repeated in a letter to Edward (*ibid.*, VI, 173), and one of which Hunter no doubt would have approved. It is illuminating that both Browne and Hunter, although advanced in their intellectual attitude towards science, were loyal subjects of the King—indeed Browne was knighted for his Royalist sympathies during the Civil War—and conservative in their political thinking. Cf. Hunter's remarks about Burke: "Mr. Burke's speeches put one in mind of a shrub of flowers, which is pretty while viewed; but, strip it of its flowers, and it will hardly be taken notice of" (John Hunter, *Essays and observations on natural history, anatomy, physiology, psychology, and geology*, 2 volumes, van Voorst, London, 1861, I, 280), and about Fox: "Accusing Mr. Fox of having debauched the minds of most of the young men of fashion in this kingdom, I was answered, that he was liked by them all: I made reply, that they were similar in that respect to the women; for they could not help having a fondness for the man that had seduced them" (*loc. cit.*). Hunter himself seemed to have had a certain fondness for him too, if we can consider as genuine the peculiar inscription "Left to my friend Charles James Fox, M. P., 1793" which is reported to be written on the back of the gold watch which had been presented to Hunter by the staff of St. George's Hospital (Geoffrey Spry Leverton, "Life and Works of John Hunter," *St. Bart.'s Hosp.* J., 1944, XLVIII, 71.)

According to Aldrovandus, some hold that there is an antipathie between it an[d] a horse which an oestridge will not endure to see or bee neere, butt while I kept it I could not confirme this opinion, which might perhaps bee raysed because a common way of hunting & taking them is by swift horses.[14]

One of his letters to Edward about the ostrich was accompanied by a delightful sketch of the head of an ostrich, copied from a cut by Ray in Willoughby's *Ornithologia* either by Sir Thomas or his daughter Frances.[15] It is pertinent to our discussion of Browne's scientific contributions to add that Ray accepted his aid when preparing his own volume on birds. "When Mr Ray was to print his Ornithologie, or discription of birds," wrote Sir Thomas to his son Edward in 1682, "I lent him many draughts of birds in colours, which I had caused at times to bee drawne."[16]

Browne did not confine his observations to exotic beasts, however, casually available in England,[17] but extended them to a host of familiar forms surrounding him. For instance:

That Moles are blind and have no eyes, though a common opinion, is received with much variety; some affirming only they have no sight: . . . some that they have eyes, but no sight; . . . some neither eyes nor sight; . . . some both eyes and sight. . . . That they have eyes in their head is manifest unto any, that wants them not in his own; and are discoverable, not only in old ones, but as we have observed in young and naked conceptions, taken out of the belly of the Dam.[18]

The experience of observation of "young and naked conceptions, taken out of the belly of the Dam," was one of his favourites:

That a Bear brings forth her young informous and unshapen, which she fashioneth after by licking them over, is an opinion not only vulgar, and common with us at present: but hath been of old delivered by ancient Writers. . . . In the Valley of Anania about Trent, in a Bear which the

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[14] Browne, *op. cit.*, V, 324.

[15] Reproduced *ibid.*, VI, 239. "I have enclosed these 2 heads of an ostridge which Franck suddenly drewe out" (*ibid.*, VI, 238).

[16] *Ibid.*, VI, 250.

[17] Those who exclaim at the unconventionality of John Hunter's menagerie at Earl's Court, and his buffaloes in harness, might wonder equally at the ostrich, and the stork, and the bittern, and the shearwater which Sir Thomas maintained in his garden for observation.

[18] *Ibid.*, II, 250-251.

Hunters eventerated or opened, I beheld the young ones with all their parts distinct: and not without shape, as many conceive: giving more credit unto Aristotle and Pliny, then experience and their proper senses.[19]

He was ready to dissect as well as to make more superficial observations:

The . . . assertion, that an Horse hath no gall, is very general, nor only swallowed by the people, and common Farriers, but also received by good Veterinarians, and some who have laudably discoursed upon Horses. . . .

It is again controllable by experience, for we have made some search and enquiry herein. . . . In the particular enquiry into that part, in the concave or simous part of the Liver, whereabout the Gall is usually seated in quadrupedes, I discover an hollow, long, and membranous substance, of a pale colour without, and lined with Choler and Gall within; which part is by branches diffused into the lobes and several parcels of the Liver; from whence receiving the fiery superfluity, or cholerick remainder, by a manifest and open passage, it conveyeth it into the *duodenum* or upper gut, thence into the lower bowels; which is the manner of its derivation in Man and other Animals. And therefore although there be no eminent and circular follicle, no round bag or vesicle which long containeth this humour: yet is there a manifest receptacle and passage of choler from the Liver into the Guts.[20]

Not only was he happy to confute the statements of the authorities, but, more important, he admitted evidence at variance with his own generalizations: for instance, in the *Garden of Cyrus*, where he was everywhere seeking patterns to conform to the quincunx, he wrote:

As for those Rhomboidal Figures made by the Cartilagineous parts of the Wezon, in the Lungs of great Fishes, and other animals, as Rondeletius discovered, we have not found them so to answer our Figures as to be drawn into illustration; Something we expected in the more discernible texture of the lungs of frogs, which notwithstanding being but two curious bladders not weighing above a grain, we found interwoven with veins, not observing any just order. More orderly situated are those cretaceous and chalky concretions found sometimes in the bignesse of a small fetch on either side their spine; which being not agreeable unto our order, nor yet observed by any, we shall not here discourse on.[21]

And who can doubt that he spoke out of his own experience and delight when he wrote in the *Pseudodoxia*:

Whoever observeth the first progression of the seed before motion, or shall take notice of the strange indistinction of parts in the Tadpole, even when

[19] *Ibid.*, II, 196-197. [20] *Ibid.*, II, 184-185. [21] *Ibid.*, IV, 100.

it moveth about, and how successively the inward parts do seem to discover themselves, until their last perfection; may easily discern the high curiosity of Nature in these inferiour animals, and what a long line is run to make a Frog.[22]

That he added " Experiment unto Speculation " as well as " Sense unto Reason " is also clearly evident from his writings. Some of his " experiments," to be sure, were admittedly naive in their motivation:

That a King-fisher hanged by the bill, sheweth in what quarter the wind is by an occult and secret propriety, converting the breast to that point of the Horizon from whence the wind doth blow, is a received opinion, and very strange; introducing natural Weather-cocks, and extending Magnetical positions as far as Animal Natures. A conceit supported chiefly by present practice, yet not made out by Reason or Experience. . . .

As for experiment, we cannot make it out by any we have attempted; for if a single King-fisher be hanged up with untwisted silk in an open room, and where the air is free, it observes not a constant respect unto the mouth of the wind, but variously converting, doth seldom breast it right. If two be suspended in the same room, they will not regularly conform their breasts, but oft times respect the opposite points of Heaven.[23]

That the young Vipers force their way through the bowels of their Dam, or that the female Viper in the act of generation bites off the head of the male, in revenge whereof the young ones eat through the womb and belly of the female, is a very ancient tradition. . . .

As for the experiment, although we have thrice attempted it, it hath not well succeeded; for though we fed them with Milk, Bran, Cheese, &c. the females always died before the young ones were mature for this eruption.[24]

Others of his own experiments were however less credulous; some of these follow:

It is generally conceived, an Ear-wig hath no Wings, and is reckoned amongst impennous insects by many; but he that shall narrowly observe them, or shall with a needle put a side the short and sheathy cases on their back, may extend and draw forth two wings of a proportionable length for flight, and larger then in many flies. The experiment of Pennius is yet more perfect, who with a Rush or Bristle so pricked them as to make them flie.[25]

That Worms are exanguious Animals, and such as have no bloud at all, is the determination of Phylosophy . . . We refer it unto the discernment of

[22] *Ibid.*, II, 230.
[23] *Ibid.*, II, 213-214.
[24] *Ibid.*, II, 237-238.
[25] *Ibid.*, II, 297.

others what to determine of that red and sanguineous humor, found more plentifully about the Torquis or carneous Circle of great Worms in the Spring, affording in Linnen or Paper an indiscernable tincture from bloud. Or wherein that differeth from a vein, which in an apparent blew runneth along the body, and if dexterously pricked with a lancet, emitteth a red drop, which pricked on either side it will not readily afford.[26]

There is found in the Summer a kind of Spider called a Tainct; . . . this by Country people is accounted a deadly poison unto Cows and Horses; who, if they suddenly die, and swell thereon, ascribe their death hereto, and will commonly say, they have licked a Tainct. Now to satisfie the doubts of men we have called this tradition unto experiment; we have given hereof unto Dogs, Chickens, Calves and Horses, and not in the singular number; yet never could find the least disturbance ensue.[27]

Even these experiments, however, were more primitive perhaps than some he performed, which bore the stamp of a somewhat maturer mind:

And because many affirm, and some deliver, that in regard it hath lungs and breatheth, a Frog may be easily drowned; though the reason be probable, I find not the experiment answerable; for fastning one about a span under water, it lived almost six days. Nor is it only hard to destroy one in water, but difficult also at land: for it will live long after the lungs and heart be out; how long it will live in the seed, or whether the spawn of this year being preserved, will not arise into Frogs in the next, might also be enquired: and we are prepared to trie.[28]

The windpipe of hernes & bitterns cutt, they live & goe about after & make a noyse:—butt if you tye the lower part of the weazon they gaspe & dye sooner.[29]

Digestion is delivered to bee made in the lower part of the stomack: evidenced in pickerells, a voracious animal, whoe swallowe fishes, & gradually digest them at the lower extreme, the upper remaining unaltered, though the lower part seemes of hardest mutation, they swallowing the head formost; & their mawes are long, not round & short.

One kept in a cesterne lived 6 dayes, the roach in the mawe not half digested.[30]

A ginnie pigge castrated grew bigger.
A monkey of twelve years guelded.
A rabbet of a yeare old the same time, March XII. 1649. The ejaculatory

[26] *Loc. cit.*
[27] *Ibid.*, II, 298-299.
[28] *Ibid.*, II, 230.
[29] *Ibid.*, V, 341.
[30] *Ibid.*, V, 338.

vessels cutt close to the parastatoe, the seminall veynes about 2 inches upward bled litle; dogs bleed more, horses for prevention of the effusion are seared.

The different magnitude of testicles & how in the same animals they agrandise about the time of coition in the spring is very remarkable.[31]

These quoted fragments represent only a smattering of examples of his interest in natural history of animals; further examples from the *Pseudodoxia*, from his *Miscellany Tracts*, from his *Notes on the Natural History of Norfolk*, from his *Observations in Anatomy*, from his letters to his son Edward, from his common-place books and from other miscellaneous writings, could be added in sufficient numbers to fill a copious volume. Since these are available to any who care to savour the delights of dipping into his published works, further enumeration of them will be omitted here. What remains for us here, rather, is the attempt to discover why he made no more of himself as a scientist, so that we may compare him later with John Hunter.

There are those who believe that Browne did not fail for not making the attempt. Edmund Gosse, his best biographer, but still a limited one and no scientist, believed he nourished a strong desire to become elected to the Royal Society, and quoted excerpts from his letters to Henry Oldenburg to suggest the petulance of his hopes.[32] The letters, however, need not be so interpreted, and clearly Browne's relationships with the Royal Society were cordial: Browne, who, like the Hunters, was an avid collector, made liberal contributions to the Royal Society's Museum, as is apparent from Grew's *Catalogue*, and frequently advised his son Edward, in his letters to him, quite without bitterness, how to proceed in his own relationships with the Royal Society. These, indeed, were so successful that the Society elected Edward, far less skilful a scientist than his father, to its Fellowship. I believe it may be safely assumed that its failure so to honour Sir Thomas was due not so much to a deliberate snub to his scientific efforts, as to the Society's antagonism to the form in which his contributions were described. The Society at its origin expressed itself clearly as standing against pomposity and lack of simplicity in contemporary scientific thought and expression, exact-

[31] *Ibid.*, V, 336.

[32] Edmund Gosse, *Sir Thomas Browne*, Macmillan, London, 1905, pp. 157-158.

ing, in the words of Sprat, "from all its members a close, naked, natural way of speaking . . . bringing all things as near the mathematical plainness as they can." [83] Surely Sir Thomas, had he coveted the Fellowship, could have abandoned his verbosity had he desired; he preferred his art to the honour.

There is another point, too. He was surely a doting father, if ever a father doted: and much of his work in natural history and anatomy he turned over to his son. Indeed, a large proportion of his letters to Edward is made up of information that Sir Thomas gave him to use for his own. Many of the letters to Edward are in content in a way reminiscent, though very different from them in style, of Hunter's letters to his intellectual son Jenner:

> Examine the spine of fishes & how the spinall marrowe is ordered in them. . . . Mr Antonie Myngay intends for London on Monday next; by him I intend to send the cranium of a swan of this yeare. You may consider the eare bones [*word missing*] 2 slender long bones of the upper jawe & how the skull hath some litle places not turnd into bone &c.[84]

> I sent unto you the scull of a poulcats head by yong Mr Whitefoot. . . . I gave a Badgers skull unto Dr Clark & if you meet with an opportunity keep one: the lower jawe of that wch I had, needed no tying to the upper, butt would move and hold to the upper jawe without any tye.[85]

> If you intend the next time to read of the Larynx and the voyce, you may do well to gett the Larynx of severall animals & looke into Casserius & Aquapendente, which you had from hence, which will bee the fittest to keepe drye, & in the same site & order as they are in the animal, nor only the Larynx, butt the *Aspera Arteria* within, as of a horse, an Asse, a beare, a catt, & to find out the way of the purring of a catt, grunting of [a] hogge, hoarse voyce of a beare, Lyon, &c., why a bull hath a lesse acute voyce then an ox or cowe, since the voyce in other masles is deeper & in castrated men more shrill, feminine & acute. . . . And also why in Asthmaticall persons the wheasing & piping is made at the expiration not the inspiration, or at least farre more, & the like which meditation & thoughts may hint.[86]

> I hope you receaved the paper I sent concerning the fistula of a dolphin & the proper place thereof. It may bee brought in when you speake *de pulm.* or *de respiratione*, & I would not have you omitt it; & if you did not keepe the

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[83] Quoted by C. H. Herford in the introduction to Sir Thomas Browne, *Religio Medici and other writings*, Dent, London, [1937], p. xv.

[84] Browne, *Works*, ed. Keynes, VI, 101.

[85] *Ibid.*, VI, 217-218.

[86] *Ibid.*, VI, 114.

skull of the dolphin you cutt up, I will God willing send you one. . . . When you see the elephant observe whether hee bendeth his knees before & behind foreward differently from other Quadrupeds, as Aristotle observeth, & whether his belly bee the softest & smoothest part; the testes are not exterior & outward butt inwardly in the body, as Aristotle. Perhaps the booke hath the dissection of a camell; it were good to observe of what that bunch in the back consisteth, whether the backbone or spine ariseth up into it, or it bee a lump of flesh upon it & the spine notwithstanding bee as in others. I thought good to give these hints, because probably they would not come into your mind. My hedghogge being putt into my garden gott away with 2 yong ones & I never look to find them agayne; observe the teeth because you speake of them, ***de dentibus.*** God blesse you all.[37]

Not only were the letters full of hints and casual observations, but they often included long passages for Edward to use *verbatim*; and indeed, there is good evidence that the whole of Edward Browne's Harveian Oration was written by his father.[38] That Sir Thomas contributed so liberally to his son may account in part for his own lack of recognition as a scientist. But that he was so generous can hardly be attributed to his own weakness of scientific interest: after all, John Hunter, to posterity's dismay, turned over the major portion of his own writings to his son-in-law.

One of Sir Thomas's literary critics has analyzed Browne's failure to attain scientific success as follows: " Browne was scientific just up to the point where the examination of detail ends, and its co-ordination begins. . . . Such inquiries are the stuff of which great scientific theories are made. Browne, however, used his love of details for another purpose: he co-ordinated them, not into a scientific theory, but into a work of art." [39] I, for one, am not convinced that this is the whole story; there is some possibility that Browne was thinking, when he wrote the *Garden of Cyrus*, with a logic, or lack of it, akin to that of the investigators who promulgated the doctrine of the Unity of Type.

Sir Thomas himself was perhaps better able to diagnose his own own case:

[37] *Ibid.*, VI, 77-78.
[38] *Ibid.*, VI, 194, f. n. 2.
[39] Lytton Strachey, *Books and Characters, French and English*, Harcourt, Brace, New York, 1922, pp. 43-44.

Although in this long journey we miss the intended end, yet are there many things of truth disclosed by the way; and the collaterall verity may unto reasonable speculations some what requite the capital indiscovery.[40]

Here may be one clue to the ultimate difference between Sir Thomas and John Hunter. Hunter was never even momentarily distracted by the collateral verities, let alone " requited for the capital indiscovery "; he never could allow his scientific observations to be diluted by material not immediately germane to the subject under observation.

Compare their outlooks on some of the problems they examined in common. Sir Thomas's notes on castration were some of them cited above; a paragraph follows them which may be appended here:

To castrate a peacock, what alteration it produceth in their plumage, might it cause it in their flesh wch is white & tender, more probably it may better the flesh of Bustards.[41]

John Hunter's notes on castration were at a higher level than those of a gastronome:

In the dissection of a spayed sow the vagina was very small, was thin in its coats, and pale. The rugae were very faint, became smaller and smaller upwards, and at last terminated in a blind point. This shows that in spaying they cut off the horns of the uterus, or rather the whole of the uterus.[42]

Hunter's greater attention to what we consider scientific detail is expressed, too, in his description of an experiment which we know Sir Thomas performed: " Aristotle sayth," wrote Browne, " that the tayle of a snake cutt of will growe agayne. I have observ'd the same in a green lizard; " [43] and this is the full citation. Compare Hunter's paragraph dealing with the same phenomenon:

The tails of lizards are so tender as to be easily pulled off by the strength of the animal when held by the tail; but this tenderness is only confined to the part of the tail beyond the bed of the penis, for there the tail is very strong. The reason why the tail should be so brittle, is perhaps to allow the animal to make its escape when caught by the tail, for it is generally broken in that way.[44]

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[40] Browne, *op. cit.*, III, 255.
[41] *Ibid.*, V, 336.
[42] Hunter, *op. cit.*, I, 237.
[43] Browne, *op. cit.*, V, 306.
[44] Hunter, *op. cit.*, II, 364.

Compare, too, their comments on the anatomy of bees; "he that would exactly discern the shape of a Bee's mouth," wrote Browne,

needs observing eyes, and good augmenting glasses, wherein is discoverable one of the neatest peeces in nature; and must have a more piercing eye then mine, who findes out the shape of buls' heads, in the guts of drones pressed out behinde, according to the experiment of Gomesius; wherein notwithstanding there seemeth somewhat which might incline a pliant fancy to credulity of similitude.[45]

There are no "pliant fancies to credulity of similitude" in Hunter's account of the animals he loved so dearly ("I amuse myself with bees," [46] he used to say):

All this tribe of insects have pincers or forceps at their mouths; which, in the bee, serve as a weapon of offence and defence, for holding anything they want to move from place to place; as also to model their wax in the making of their cells. The blades of the forceps cross one another, but it is not always the same that overlaps.[47]

And he wrote of a "small Bee which I caught on the St. John's Wort, collecting Farina:"

I caught four or five of this species in the month of July, collecting farina: they were all females. They are longer than the small common fly, but not thicker. They have two pincers [mandibles] and a proboscis. The proboscis is attached under the head: it first passes a little back under the head, and then folds immediately on itself, passing forwards to the anterior part of the head between the two pincers, lying there as in a groove; and when it opens or unfolds for use, it falls back and down. The first fold or joint consists of two horny parts [maxillae], passing nearly parallel to each other, having a joint at the head; the last fold consists of three parts, also horny and passing parallel to each other: the middle one is the broadest, and is an additional one just between the outer ones. There is a soft springy part, I believe feathered, as also with a horny process which is moveable, or has a joint. This is just the contrary way to the situation of the fixing and unfolding of the proboscis of the humble-bee or common bee.[48]

But the most expressive pointing up of their difference is accomplished by their remarks on the metamorphoses of the silkworms. "The silk-moth" wrote Hunter,

[45] Browne, *op. cit.*, IV, 97.
[46] Sir James Paget, *Hunterian Oration*, Longmans, London, 1877, p. 10.
[47] Hunter, *op. cit.*, II, 447. [48] *Ibid.*, II, 455.

like all of this class of insects, is first an egg, then a caterpillar, chrysalis, and moth. The caterpillar is a long body, consisting of a head, body, and tail with appendages. . . .

While in the caterpillar-state they spin silk threads from their mouth by way of attachment. If the head is first removed from the object to which the animal may be attached, it then holds fast by its two holders at the tail; and when these are got the better of, it has no hold: but, if the tail be removed first, it fixes its head by its silk, and it is held by that means, and will allow of being pulled to any length from its hold, just as a spider is by means of its silk. If it be made to hang by its silk, it winds or coils up this silk thread round its fore-feet; therefore it has the same power with the spider.[49]

And Sir Thomas, in the *Religio*:

Those strange and mystical transmigrations that I have observed in Silkworms, turned my Philosophy into Divinity. There is in these works of nature, which seem to puzzle reason, something Divine, and hath more in it then the eye of a common spectator doth discover.[50]

And earlier, too, in the *Religio*, he made a similar confession: "Where I cannot satisfy my reason, I love to humour my fancy."[51] Here is the salient point: Hunter was incapable of humouring his fancy where he could not satisfy his reason. "Why think?" he had written Jenner; "why not try the experiment?"[52] Hunter could never have included among his queries that revealing note from Sir Thomas's common-place book: "Whether possession bee not often mistaken for wichcraft, and many thought to bee bewiched which are indeed possessed?"[53] The question would have been as utterly without meaning for him as it is for us.

This, indeed, is the crux of the whole matter: the manner of the framing of the question. "Quaere in your Aristotle,"[54] Browne wrote to his son Edward in a letter dealing with shedding and regeneration of the cuticle, and this is a revelation, too. Not only in the *Pseudodoxia*, whose explicit purpose was to make "Enquiries into very many received tenents and commonly presumed truths,"[55]

[49] *Ibid.*, II, 466-467.
[50] Browne, *op. cit.*, I, 50.
[51] *Ibid.*, I, 14.
[52] Stephen Paget, *John Hunter, man of science and surgeon (1728-1783)*, Longmans, London, 1897, p. 107.
[53] Browne, *op. cit.*, V, 254.
[54] *Ibid.*, VI, 80.
[55] *Ibid.*, II, 1.

but in all of his thinking, Browne proceeded from the question for the question's sake; Hunter proceeded primarily from the organism and from his consuming interest in the organism as such. No one who has read a word of his writing can have the slightest doubt of it, just as no one familiar with Browne can attribute to him this trait of mind.

But what does this tell of the two men themselves? Was Hunter's more modern way of looking at biological problems something that was related only to his own innate qualities of mind, or was it conditioned within him by the fact that he was living in an England which had become familiarized, since Browne's day, with the ideas of Bacon, and Descartes, and Leibniz, and Newton?

Browne, of course, who read more than most, had read Descartes [58] and probably Bacon, and his thinking was almost certainly thereby affected. Hunter, who claimed to have read nothing, had almost certainly no first-hand acquaintance of them; yet they probably influenced him more, indirectly, than they had Sir Thomas directly. For that intervening century had surely ripened in England a growing appreciation of the experiment as a method, and of an animal as a mechanism; and to this extent Hunter enjoyed benefits not available to Browne. The definition of science had altered; a language of science had developed; the systematization of zoology had meantime been effected.

The exploitation of these later advantages was not however a necessary prerequisite for the application of the experimental method to biology. Harvey accomplished it without them, as did Robert Boyle, and Stephen Hales. There was something in the spirit of the times that encouraged the fruition of Hunter's labours; but there was something in the man and the mind that motivated his endeavour —something akin to what had been in the minds of Harvey, and Boyle, and Hales—something alien to the mind of Sir Thomas Browne.

Browne's deliberate and studied calling to account of the statements of the classical "authorities," the gullibility of his experimental approach, and indeed, his heavy verbosity, all mark him as a thinker characteristic of his period, which he lacked the intellectual

[58] *Ibid.*, II, 113, 136; VI, 283.

power to escape. Hunter's declared and manifest disregard for the literature of science in favour of its practice, the single-mindedness, the force and the originality of his scientific achievement, the simplicity—self-conscious and inarticulate though it sometimes seems—of his literary expression, all distinguish him as an investigator great in any age, and a prophet who by sheer power of intellect transcended his own. The factors in his intellectual environment which influenced him cannot be ignored, but surely he rose high above the level of contemporary thought to point the way into the thinking of the future, and for this the credit is owing to him and to him alone.

THE EXCLUSION OF ALIENS FROM THE UNITED STATES FOR PHYSICAL DEFECTS

ROSEBUD T. SOLIS-COHEN

Since colonial times immigrants with communicable diseases have been regarded as a menace both to the public health and to the public purse.

Progress in protecting the American public against this menace has been made through the appointment of a ship's physician, the elimination of overcrowding on shipboard, the establishment of effective quarantine regulations, the development of inspection both here and abroad, and the promulgation of regulations for the exclusion of immigrants undesirable on account of mental, contagious or incurable disease.

Elimination of Overcrowding on Ships

Overcrowding on ships as an important factor in the spread of contagious diseases was recognized by colonial Pennsylvania, which in 1729 [1] passed a law to prevent such overcrowding. Massachusetts followed with similar legislation in 1751.[2] These measures, however, failed to solve the problem of diseases among immigrants, a mortality of ten per cent during a voyage being not unusual.

The first attempt by the Federal Government to prevent overcrowding on shipboard was the Act of March 7, 1819 (3 Stat. 488), which limited the number of passengers a ship might carry to two for every five tons of the ship, in addition to making definite requirements with respect to food and water supplies. This law also marks the first attempt by our Government to require masters of arriving ships to furnish information regarding the names, origin, or number of the passengers or crew. Nevertheless, in spite of new laws and

[1] Roy L. Garis: *Immigration Restriction*, N. Y.: Macmillan Company, 1928, p. 15.
[2] Edith Abbott: *Select Documents and Case Records*, Chicago, Ill.: University of Chicago Press, 1924, p. 6.—From Acts and Resolves of the Massachusetts Bay Colony, Vol. VII (1742-56, Ch. XII, pp. 536-37).

new ships, overcrowding and other unsanitary [8] steerage conditions continued. Epidemics of typhus fever were prevalent on ships arriving in 1827, 1835 and 1847, the last being the year of the Irish famine.

In that same year a new law was enacted to curb overcrowding. The Act of February 22, 1847 (9 Stat. 127) while retaining the previous limit of two passengers per five tons of ship's tonnage, further restricted the number of passengers by permitting " one passenger for every fourteen clear superficial feet of deck " " on the lower deck or platform," but only " one passenger for every thirty such superficial feet " on the lowest or " orlop deck." It also specified the tiers of berths to be allotted to passengers.

The evils of overcrowding were somewhat mitigated by the Act of May 17, 1848 (9 Stat. 220), which for the first time required of all ships provision for ventilation, " a safe, convenient privy or water-closet for the exclusive use of every hundred such passengers," general cleanliness—the airing of bedding on deck and disinfection of quarters with chloride of lime, facilities for cooking food—" a camboose or cooking range on deck," and the victualling of passenger vessels. This law specified the number of pounds of " good navy bread," of rice and of other edibles the ship was required to provide for each passenger. It also abolished the limitation of passengers to two for every five tons. A more comprehensive statute was the Act of March 3, 1855 (10 Stat. 715), which not only prescribed in detail the accommodations to be provided for passengers and required more liberal rations for them but also regulated the segregation of the sexes and demanded provision for a ship's hospital and the placing of handrails on ladders or stairs used by passengers. It also provided that the collector of customs should examine immigrant ships on arrival and report violations of this law to the Secretary of the Treasury. The Act of March 24, 1860 (12 Stat. 3) was the first to furnish better protection of female passengers. The first legal restrictions on the number of passengers travelling on the steamships appear in the Act of August 2, 1882 (22 Stat. 186).

The only other legislation of any importance affecting the trans-

[8] E. Abbott, *op. cit.*, pp. 4, 17, 23.

portation of passengers by sea was the Act of December 19, 1908 (35 Stat. 583). Previously the ratio of passengers to superficial deck area referred to quarters. This law restricted the number of passengers to one for every 5 feet of clear space on an upper open deck, which resulted in reducing the steerage capacity of some ships one-third. The law of 1908 has not been superseded by any more recent legislation. Improvements, however, not legally prescribed, doubtless have been made as a result of business competition for passengers.

Quarantine Governing Passengers from Foreign Shores

In the American colonies the earliest quarantine was instituted by "orders." In 1647 New Netherlands [4] issued an order in council and in the same year the General Court of Massachusetts issued an order (March 18, 1647 or 1648) [5] proclaiming quarantine against the "Barbadoes Distemper" which was raging in the West Indies. The order provided that all ships coming to Boston from the West Indies must remain at anchor in the harbor and await the permission of the Council before landing passengers or discharging cargo. The penalty for violation was £100. The order was repealed on May 2, 1649 [6]

> "seeing it hath pleased God to stay the sickness there."
>
> (West Indies)

A quarantine regulation of this General Court, enacted in 1665, ordered all vessels coming from England to be quarantined because of the great plague then prevailing in London. The quarantine law passed in 1701-2 (1701-2, ch. 9) became the basis of all subsequent legislation in Massachusetts. It consisted of two parts, the one being concerned with land quarantine, and the other with maritime

[4] Susan W. Peabody: *Historical Study of Legislation Regarding Public Health in the States of New York and Massachusetts*, Chicago, 1909. Supplement No. 4 to the Journal of Infectious Diseases, p. 74.

[5] *Records of the Governor and Company of the Massachusetts Bay in New England*, Boston: William White, 1853, Vol. II, p. 237.

[6] Henry S. Mustard: *Government in Public Health*, New York: The Commonwealth Fund, 1945, pp. 117 and 118. The text of the original order is printed on page 118.

quarantine. When an infected vessel arrived in port, the justice of the peace could prevent persons landing from or boarding the vessel. He also might make out a warrant to the sheriff or constable.[7] In 1716 a committee was appointed by the General Court to select a site for a quarantine hospital. In the following year the Committee purchased Spectacle Island, on which was erected the first quarantine hospital in Massachusetts.[8]

The earliest jurisdiction over quarantine was exercised by the Governor and Council of the Colony of Massachusetts Bay. Later they were assisted by the selectmen of Boston. The law of 1797 conferred on the selectmen full power over quarantine. These quarantine powers were delegated, under the law of June 20, 1799 to a Board of Health appointed in the same year.[9]

William Penn is given the credit for the earliest quarantine act on record in America. It was passed on October 4, 1700, and was entitled "An act to prevent sickly vessels coming into this government."[10] In 1719 Patrick Baird, "chirurgeon" of Philadelphia, was authorized and required to board all incoming vessels.[11]

The Act of 1700 seems not to have been enforced, however, until April 1728, when a vessel, the Dorothy, was detained one mile from the city. In 1729 a law was passed requiring all ships to anchor one mile from the city until inspected by the port physician. An additional

[7] Peabody, *op. cit.*, p. 42.

[8] Francis R. Packard: *History of Medicine in the United States*, New York: Paul B. Hoeber, 1901, p. 167.

[9] Outline of History, Theory and Practice of Quarantine in: Joseph Jones: *Medical and Surgical Memoirs*, Vol. III, Pt. I, New Orleans, 1890, p. 4.

[10] *Report of the Committee on Quarantine of the National Quarantine and Sanitary Convention held in Baltimore, April 29, 1858.* Published Baltimore, 1859, pp. 25 and 26 quoting from *Laws of Pennsylvania.* P. Miller's Ed. Ch. LXI, p. 182, Athenaeum.

Peabody, *op. cit.*, p. 41 and 42 mentions that Massachusetts passed a quarantine law early in 1700 but it was disallowed in Privy Council at the request of the Lords of Trade. The same author points out on p. 123:

"In the Appendix of the *Year Book of Charleston* for 1890 a quotation is given from a law of 1698 for the regulation of pilots and quarantine which antedates the Massachusetts and Pennsylvania laws by two years. This law does not appear in the published statutes of South Carolina."

[11] A. C. Abbott: Development of Public Health Work in Philadelphia, p. 3. (Abbott's is the first paper in *Laws, Ordinances and Regulations of the Department of Public Health of the City of Philadelphia* by A. A. Cairns, Phila., 1928.)

regulation of 1740 required sick immigrants to be landed at some distance from Philadelphia and taken by the shipmaster at his own expense to houses in the country.[12] A year later the Provincial Council of Pennsylvania was concerned with the establishment of an immigrant Hospital [13] and in 1743 passed an act providing for a lazaretto or hospital for sick passengers arriving in the province, and "to prevent the spreading of infectious distempers." A tract of land, then called Fisher's Island and afterward Province Island, situated at the junction of the Delaware and Schuylkill Rivers was purchased for this purpose. The committee having it in charge was directed to lease the island, erect a hospital for sick immigrants, and reserve six acres for future hospital buildings. The latter were not erected until 1794.[14] In 1774 a Keeper of the Hospital on Province Island was appointed under the Act of Assembly to direct inspection, cleaning, and detention of all incoming vessels. The law of 1794 as amended is the foundation for Pennsylvania's statutory quarantine law.[15]

About the year 1800 the Board of Health of Philadelphia, having purchased ten acres of ground on Tinicum Island, ten miles below the city, erected thereon suitable buildings for a lazaretto with ample accommodations and removed the quarantine from Province Island to Tinicum Island. The latter was continued as the city's Lazaretto until 1895.[16] The Philadelphia Board of Health was given oversight of the lazaretto and of quarantine regulations in 1803.[17]

The first "state health officer" was appointed in 1712 by the General Assembly of Carolina. He was responsible for inquiring into the health of all persons who might come into the province aboard any ship, sending diseased persons to a pesthouse, cleansing himself

[12] Maurice R. Davie: *World Immigration with Special Reference to the United States*, New York: The Macmillan Company, 1928, p. 30.

[13] Extracts taken from the Minutes of the Provincial Council of Pennsylvania IV in E. Abbott: *Historical Aspects of the Immigration Problem. Select Documents.* University of Chicago Press, 1926, p. 547.

[14] *Report of the Committee on Quarantine appointed by the National Quarantine and Sanitary Convention, Baltimore, April 29, 1858*, published in 1859, p. 27.

[15] Peabody, *op. cit.*, pp. 115 and 116.

[16] A. C. Abbott: The Development of Public Health Work in Philadelphia, *op. cit.*, p. 7.

[17] Report of the Committee on Quarantine, Baltimore 1859 *op. cit.*, pp. 28-29.

before returning ashore, and otherwise taking such measures as he thought necessary.[18]

Early maritime quarantine acts covering aliens from abroad were also passed by Connecticut in 1702,[19] Rhode Island in 1711,[20] New Hampshire in 1714,[21] Virginia in 1722,[22] Delaware in 1726,[23] Maryland in 1731 [22] and 1766,[23] the Carolinas in 1698,[24] and New York in 1755.[25]

For the relief of sick foreigners a lazaretto was established on Governor's Island at the Port of New York by the Act of March 30, 1797,[26] doubtless under the authority conferred on the Governor by Section 4 of the Act of April 1, 1796. This quarantine act was amended in 1799, authorizing the purchase of a tract of land on Staten Island, on which was to be erected a hospital to be known as the Marine Hospital. This hospital carried on the functions of the lazaretto on Governor's Island and also provided for the anchorage ground of vessels subject to quarantine. The act of 1797 was again amended in 1801, fully establishing a quarantine system, while many of its original provisions have remained substantially the same through all subsequent revisions. According to Judge Birdseye, by this amended act the quarantine establishment was reduced to a

[18] Mustard, *op. cit.*, p. 92.

The full text of "Act of the General Assembly of the Province of Carolina, June 7, 1712 (S. C. St. 1712, Ch. 317). An Act for the more effectual preventing the spreading of contagious distempers." is reprinted in the Appendix of Mustard's book.

[19] C.-E. A. Winslow, Health Legislation in Colonial Connecticut. *Bulletin of the Society of Medical History of Chicago*, Vol. III, 1923-25, p. 321.

[20] Jones, *op. cit.*, p. 4: February 27, 1711.

[21] Jones, *op. cit.*, p. 9.

[22] Packard, *op. cit.*, p. 164, 176, 177.

[23] H. Williams. Baltimore's Health Service. 150 Years Old, *Baltimore Health News*, Dec. 1943, Vol. XX, No. 12, p. 206.

[24] Act of the Provincial Legislature Oct. 8, 1698 in Joseph Jones, *op. cit.*, Vol. III, pt 1, p. 2.

[25] Jones, *op. cit.*, p. 7.

Peabody, *op. cit.*, p. 4.

W. Jewell: *Historical Sketches of Quarantine*. Address before Philadelphia County Medical Society, January 28, 1857. p. 9, quoting "Report Select. Com. of Legislature of New York." (1845) gives date as 1758. This is a later law.

[26] Packard, *op. cit.*, p. 239.

regular system and endowed with vigorous and efficient powers.[27] In 1829 the support of the Marine Hospital was provided by a tax collected by the health commissioner from the master of every vessel arriving from a foreign port.[28]

New Orleans used for quarantine purposes the Charity Hospital, built by Don Andreas Almonester y Roxas in 1782 [29] to replace the one established in 1736. This became a state institution by act of the territorial legislature of 1808.

The first authoritative suggestion of quarantine in Louisiana, which was for protection against yellow fever, seems to have been made by Governor Claiborne, the first American governor of Louisiana, who in 1810 recommended to the Legislature to " subject the shipping entering the Mississippi River to those quarantine regulations which in other ports had proven salutary.[30] No action, however, was taken until 1816 and 1817, in which years certain quarantine laws and regulations were enacted.[31] In 1818 [32] an act was passed to establish a Board of Health and a Health Office and prevent the introduction of malignant, pestilential and infectious diseases into the city of New Orleans. These laws were repealed in 1819.[33] Two years later the Legislature enacted a law creating a Board of Health in New Orleans with provision for a quarantine station for the detention of vessels and for hospitals. This station was established at a

[27] *Report of the Committee on Quarantine, Baltimore 1859*, pp. 31 and 32.

[28] Jeremiah Jenks and W. J. Lauck: *The Immigration Problem*, New York: Funk and Wagnalls Company, 1917, p. 327.

[29] Personal communication from Stanley C. Arthur, Executive Director of the Louisiana State Museum.

[30] *The Louisiana State Board of Health, Its History and Work.* By the Secretary, 1904, p. 1.

[31] The Louisiana State Board of Health, *op. cit.*, p. 2. However, examination of the Session Laws fails to reveal any enactment of these quarantine laws. See *A Checklist of Session Laws* compiled by Grace MacDonald, Public Document Clearing House of the National Association of State Libraries. H. W. Wilson Co. 1936, p. 70; and Acts of Louisiana, 1816. January, Second Legislature, Second Session 1 + iii +172 pp. and Acts of Louisiana 1816. November, Third Legislature, First Session, 223 p. No legislature convened in 1817.

[32] Lisbet's *Digest to Laws of Louisiana 1804-27*, p. 23; and *Session Laws of Louisiana 1818, Second Session, Third Legislature*, p. 124 English, p. 125 French. Report, Baltimore 1859, *op. cit.*, p. 34.

[33] Lisbet's Digest, *op. cit.*, p. 23.

point sixteen miles below the city, where quarantined vessels were detained for ten days. The law was repealed in 1825. Thirty years later the Louisiana Legislature passed an act creating the State Board of Health and providing for a quarantine station not less than seventy miles by river below the city. It also stipulated that there should be stations at the Rigolets Pass and Atchafalaya River, to be operated only from May 1 to November 1.[34]

The quarantine laws established in Massachusetts, Pennsylvania, Louisiana and New York have served as patterns for the quarantine laws of other communities.[35]

The first Federal law concerning quarantine (Act of May 27, 1796) (1 Stat. 474) authorized the President to direct certain Federal officers, such as revenue officers and officers commanding the ports and revenue cutters, to assist the states in executing their quarantine laws relating to ships.

Another Federal law was passed in February 1799,[36] which provided for the observance of state laws regarding quarantine by various classes of Federal officers.

Attempts were made to obtain Federal quarantine laws in 1800, 1802 and 1832.

The need for federal control of immigration became evident in 1847, the year of the famine in Ireland, when crowds of Irish immigrants infected with typhus fever entered the harbor of New York. As a result, that same year New York State was obliged to levy a tax for the care of immigrants suffering from contagious diseases [37] and petitioned Congress for aid in caring for the sick immigrants.

The year 1852 [38] saw the origin of a movement to establish quarantine standards by international agreement to prevent the spread of cholera. In accordance with international conventions, ships were detained in quarantine for only five diseases: Asiatic cholera, plague, small pox, yellow fever and typhus fever.

[34] *Louisiana State Board of Health, its History and Work with a brief review of health legislation and maritime quarantine in Louisiana.* By the Secretary of 1904. St. Louis, 1904, p. 4.

[35] Report, Baltimore 1859, *op. cit.*, p. 36.

[36] Peabody, *op. cit.*, p. 128.

[37] E. Abbott: Select Documents and Case Records, *op. cit.*, p. 172.

[38] M. Victor Safford: Immigration Problems, *op. cit.*, p. 161.

In 1875,[39] the United States Immigration Service assumed charge of the Immigrant Hospital at New York and sent diseased immigrants there.[40]

During the first seventy-five years of the nineteenth century, Federal quarantine activity was limited to cooperating with states and localities in enforcing the quarantine laws.

In 1878 (Act of April 29, 1878) (20 Stat. 37) the Federal law authorized officers of the Marine Hospital Service to act as officers of the national quarantine system [41] and required consular reports on the sanitary condition of ports from which vessels might come. The quarantine powers of the Marine Hospital Service were transferred to a National Board of Health, created March 3, 1879 (20 Stat. 484). The latter was empowered by the law of June 2, 1879 (21 Stat. 5) to make regulations governing vessels at the port of departure and in transit.

Quarantine as a measure for protecting the nation against dangerous contagion became more efficient with the passage of the Quarantine Law of February 15, 1893.[42] This Act extended the powers of the Federal Government in preventing the introduction of contagious diseases into the country. It is still in force and is the basis for all existing domestic and maritime legislation. It requires infected vessels arriving in the United States to be sent to the nearest quarantine station and to be certified after being disinfected.

In 1900 the quarantine regulations were extended to Porto Rico and Hawaii (31 Stat. 80, 160) and in 1903 to vessels entering the United States or territories from the Philippine Islands (32 Stat. 691).

Federal Inspection of Immigrants

Before 1890 the United States Treasury Department seemed unable to make general provision for the medical inspection of immigrants, as this work was undertaken only at the Port of New York, under a contract between the Secretary of the Treasury and

[39] Act of March 3, 1875.

[40] Lawrence F. Schmeckebier: *The Public Health Service, Its History, Articles, and Organization.* Johns Hopkins Press, 1923, pp. 77, 78, 79.

[41] Mustard, *op. cit.*, p. 53.

[42] 27 Stat. 449.

the New York State Emigration Commission, which designated the latter to take charge of the local affairs of immigration.[43] In that year for the first time the United States Government [44] assumed the duty of inspecting immigrants at New York City.

However, it was not until March 3, 1891 (26 Stat. 1084) that legislation was passed placing the medical inspection of immigrants at all ports under the control of the United States Immigration Service. This inaugurated the first systematic examination of immigrants at United States ports. Provision was made for the medical inspection of alien immigrants by surgeons of the Marine Hospital Service or by a civil surgeon. The number of immigrants rejected compelled steamship companies to select passengers more carefully at foreign ports.[45]

In 1893 a law was enacted requiring any vessel leaving a foreign port for the United States to obtain a bill of health from the United States consular officer at the port of departure,[46] which together with the certificate obtained from the health officer at the United States port of entry are considered part of the ship's papers.

United States consuls are also required to make sanitary reports of foreign ports from which disease may be transmitted into the United States. The Marine Hospital Service, now the U. S. Public Health Service, was also required to obtain information concerning the sanitary condition of these ports.

A so-called medical inspection of immigrants aboard was begun in 1899 at Naples. This inspection is referred to as "so-called" [47] because Public Health Service officers were detailed abroad mainly for quarantine purposes rather than for inspection purposes.

"As a result of this foreign inspection, in an ordinary year about four times as many intending emigrants are refused transportation for medical reasons

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[43] Schmeckebier, *op. cit.*, p. 17.

[44] *Annual Report of the Supervising Surgeon-General of the Marine Hospital Service of the United States for 1890*, p. 55.

[45] Abbott: Select Documents and Case Records, *op. cit.*, p. 71. Also *Annual Report of Commissioner General*, 1907, p. 10.

[46] *Idem*, p. 450.

[47] Personal Communication with the Senior Surgeon, Assistant Chief of the Hospital Division of the U. S. Public Health Service.

alone as are debarred here for all causes, and about ten times as many as are debarred for medical reasons only." [48]

Another attempt to arrange for effective examination of immigrants before embarkation was made by the Act of February 20, 1907 (34 Stat. 898-911), which authorized the President to convene an international conference on immigration and to arrange with foreign countries for examination abroad before embarkation.

The medical inspection of aliens, as we now know it, was first accomplished in 1925 by the assignment of Public Health Service officers to American consulates abroad.[49] Since 1930 these officers have had to travel from one American consulate to another in the interest of economy.

Since 1934, the year of the Philippine Islands Independence Act, medical officers of the Public Health Service on duty at Manila have been authorized to perform the medical examinations of citizens of the Philippine Islands who apply.[50]

Exclusion for Disease

Regulations for excluding aliens on medical grounds had their origin in colonial Massachusetts in 1700.[51]

An unsuccessful attempt was made in 1838 to pass a Federal law penalizing any ship master who transported a person afflicted with an incurable disease.[52] By the Act of August 3, 1882 (22 Stat. 214) " any person unable to take care of himself or herself " was excludable but available evidence does not show that this act was interpreted as medical grounds for exclusion. However, it was not until 1891 that physical disease became a ground for exclusion.

The Act of March 3, 1891 (26 Stat. 1084) listed as one of the

[48] *Report of the Commissioner of Immigration*, 1911, Vol. I. Abstracts of Reports of Immigration Commission, p. 26.

[49] Personal communication and *Report of the Surgeon General of the Public Health Service*, 1926.

[50] The Philippine Islands Independence Act provides for the application of the immigration laws of the United States to citizens of the Philippine Islands. *U. S. Public Health Service Report*, 1934, p. 68.

[51] R. E. Albright: " Colonial Immigration Legislation," *Sociology and Social Research*, 12: 443-8, May '28, p. 446.

[52] Jenks and Lauck, *op. cit.*, p. 43.

classes of aliens denied admission " persons suffering from a loathsome or dangerous contagious disease." [53] The medical examination was to be made by surgeons of the Marine Hospital Service or, in an emergency, by a civil surgeon. This Act and subsequent acts exclude " persons suffering from loathsome or dangerous contagious diseases " but do not list the actual diseases deemed excludable. The interpretation is delegated to the Surgeon-General of the U. S. Public Health Service, who has stated his explanation of the laws in a series of published regulations of the medical inspection of aliens. The first of these appeared in a *Book of Instructions* issued in 1903. This booklet was superseded by a similar one in 1910, which in turn gave place to another in 1917, which was replaced by the most recent regulations, those of 1930, which are still in current use. Some brief and minor changes have been made by two amendments, issued on January 26, 1932 and March 12, 1942, by Foreign Quarantine Division Circular No. 68, issued on March 12, 1942, by Hospital Division Circular No. 264, issued May 25, 1937, and by an unnumbered Circular issued September 10, 1936. Officially the 1930 Regulations are still in force. At the present time aliens arriving at ports of entry in the United States are examined by a Public Health Doctor. The regulations of 1903, 1910, 1917 and 1930 divided diseased aliens into three classes: A, those having a mental disease or defect or a dangerous contagious disease; B, those having a physical defect which affects a person's ability to earn a living; and C, those having less serious physical defects which require a record. Class A and Class B certifications have provided two broad bases for exclusion, namely for loathsome and contagious diseases and for liability to become a public charge.

Class A of Diseased Aliens

Those having mental or loathsome and contagious diseases were given Class A medical certificates which made their exclusion mandatory.

Trachoma was classed as a dangerous contagious disease by the United States Public Health Service in 1897, increasing greatly the

[53] For full text of this section of the Act, see the Statute.

number of persons excluded in that and subsequent years.[54] Trachoma was also listed as a dangerous, contagious disease in the 1903 *Book of Instructions for the Medical Inspection of Aliens.*

Pulmonary tuberculosis was not specifically made certifiable as Class A by the Act of 1903. The Surgeon-General, however, interpreted the Act as making this disease certifiable. The act of 1907 specifically provides for the exclusion of "persons afflicted with tuberculosis." Interpreting this Act, the Surgeon-General made tuberculosis of the intestinal and genito-urinary tracts, as well as pulmonary tuberculosis, mandatorily excludable, but in the 1910 Book of Instructions he classified as Class 3 tuberculosis of the skin, glands, bones and joints. This was changed when "tuberculosis in any form" was made certifiable as Class A, both in the Act of 1917 and in the 1917 Regulations which elaborate the Act.

Leprosy was first certifiable as Class A in the 1903 Book of Instructions. The exclusion of lepers continues to be mandatory.

Actinomycosis was listed as a loathsome, contagious disease in the Regulations of 1910.

Venereal diseases were first certifiable as Class A in the 1903 Book of Instructions. "Active *syphilis*," which was mandatorily excludable in the same book, was more specifically defined as "active syphilis in the communicable stage" in the *Book of Instructions for 1910.* A Wassermann test was required by the 1917 Regulations. Syphilis is listed as a loathsome or dangerous contagious disease in the 1930 Regulations. The qualification "in the communicable stage" was added by Amendment 2, issued in March, 1942. Further amendment of these Regulations was made by Foreign Quarantine Division Circular No. 68, which draws sharp distinction between active communicable syphilis, which should be certified as Class A, and non-communicable syphilis, affecting the alien's ability to earn a living, which should be certified as Class B. If non-communicable syphilis does not affect the person's ability to earn a living, it should be noted for the record and certified as Class C.

Frambesia or yaws was added to the excludable diseases in the 1910 Regulations.

[54] *Report of the Commissioner General of Immigration*, 1911, Vol. I, p. 110.

Also listed as Class A diseases are *gonorrhea* since 1903 (Regulations) and *soft chancre* since 1910 (Regulations).

Lymphogranuloma inguinale, commonly known as topical bubo, was classified as a loathsome, contagious disease in 1937. The Surgeon General [55] of the Public Health Service directed that the infectious period of the disease be considered to last until all signs of the disease have disappeared.

Certain skin diseases are listed as contagious and certifiable as Class A. Such a disease is *favus*, listed first in 1903. Reference to its treatment by X-ray was first made in the 1917 Regulations. *Ringworm of the scalp*, *sycosis barbae*, and *blastomycosis* are also first found in the Regulations of 1910.

In 1910, for the first time, a number of tropical diseases were listed as " dangerous contagious." [56] Other diseases caused by animal parasites were first added to the excludable classes in the 1917 Regulations.[57]

Class B of Diseased Aliens

Physical defects which are not loathsome or dangerous contagious may render a person unable to earn a living. These defects are certifiable as Class B. This statement was first included in the 1903 Regulations, which interpret the statute of 1891. Persons with *physical defects affecting their ability to earn a living* were added to the excludable classes by statute in the Act of February 20, 1907 (34 Stat. 898-911). Examples of such physical defects listed in the 1903 Regulations are hernia, valvular heart disease, chronic rheumatism, malignant diseases, deformities, senility and debility, varicose veins, and serious defects in vision. The last named was defined in

[55] *Hospital Division Circular* No. 264, issued May 25, 1937.

[56] *Mycetoma*, also known as Madura foot; *filariasis*, a disease caused by parasites and affecting the lower extremities with elephantiasis; *uncinariasis*; *amoebic infection* and *endemic hematuria*. The last mentioned is also called Bilharzia disease and was omitted in the 1917 and 1930 Regulations. Uncinariasis is listed as excludable on page 17 of the Book of Instructions for the Medical Inspection of Aliens of 1910 issued by the United States Public Health Service, although the same Service states on page 157 of its Annual Report of 1913: " This is the first year (1913) that incinariasis was classified as an excludable disease."

[57] These include *oriental sore* (cutaneous leishmaniasis), *trypanosomiasis*, *paragonimiasis*, *schistosomiasis*, and *clonoarchiasis*.

the 1917 Regulations as "unaided vision of 20/70 or less." These Regulations also give details concerning progressively increasing impairment of vision.

"Poor physique," a broad, vague classification, is listed in the 1903 Regulations. The 1910 Regulations add examples of still other Class B defects: cutaneous affections, eruptive fevers, and anaemia. Pregnancy was certifiable as Class B in 1903. Although under certain conditions pregnancy should be certified as Class B, according to the Regulations of 1910 and 1917, the latter state that pregnancy should be regarded as ordinarily certifiable as Class C.

In general, other conditions certifiable as Class B are cases requiring hospitalization, listed in 1903, to which were added in 1910:

All defective and diseased conditions of a more or less permanent character tending to call for institutional care or treatment.

All conditions not incompatible with traveling but that need or are likely to need medical treatment, whether for a short or a more or less protracted period.

All cases of diseased, deformed, or crippled children who will require unusual care during childhood, and who are likely to be physically defective if they live to maturity.

Class C of Diseased Aliens

Physical defects which do not possess the prescribed requirements for certification under Class A or B, *which are less serious* than those in Class A or B but *which require a record*, are certified as Class C.

Without reference to classification as A, B, or C, two provisions in 1917 (Regulations) required the physician to determine whether an alien was "physically capable of reading" and whether aliens were afflicted with psoriasis.

Summary and Conclusions

This brief review of the establishment of effective quarantine regulations and of the development of the medical inspection of aliens indicates what has been accomplished for the protection of the people of this land against the introduction of contagious diseases from abroad. The regular, efficient quarantine systems established in

Massachusetts, Pennsylvania, Louisiana, and New York served as patterns for other communities and preceded the enactment of the Federal Quarantine Law of February 15, 1893, which is still in force. The medical inspection of immigrants is authorized by a clause in the Federal Statute of 1891 which denies admission to persons suffering from a loathsome or a dangerous contagious disease. This clause, however, is not explained in the Act. Its interpretation is left to the Surgeon General of the U. S. Public Health Service and varies from time to time.

Whether it is advisable to revise the regulations governing the medical inspection of aliens in the light of the more recent contributions made by medical science is a matter for the Public Health Service to determine. Inasmuch as some of the diseases listed as loathsome and contagious are now curable, it might be desirable to remove them from the list. It also might be necessary to add other diseases to the list of those mandatorily excludable. Based on present medical knowledge, a revision of the regulations might prove more just to the alien, more useful to the public health surgeon, and a greater protection to the American people.

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STUDIES ON MORTALITY SINCE THE RENAISSANCE *

SIGISMUND PELLER

E. Men's Reproductive Activity

In the first three papers of this series data pertaining to infants, children and women were dealt with. Special attention was paid to neonatal and maternal mortality. In the fourth part multiple births were discussed. In the forthcoming two papers developments in men will be studied. The material is again taken from Isenburg's genealogical tables (1).

Marital Status and Wedding Age

The present study comprises a total of 2,629 males past the age of 14 years. All of them were born between 1480 and 1879 inclusively. According to the time of birth 577 belonged to the first of the four centuries, 795 to the second, 652 to the third, and 605 to the fourth century. The maximum of births occurred between 1580 and 1679.

All figures regarding Europe's general population and its growth prior to the 19th century are rather vague estimates, for no census was taken before the middle of the 18th century and the earlier figures on births and deaths used as a basis for calculation were not comprehensive enough. It is only for the last 200 years that demographic data for large parts of Europe permit reliable estimates and calculations.

During the 19th century the general population of Europe has rapidly increased; that of industrialized England by 164%, of Germany by 127%, of Italy by 80%. Even the population of France has grown by 43%, but the population of the ruling caste was already diminishing in the second century. Obviously, sociological factors which since about 1750 were responsible for the growth of Europe's population, such as the development of agriculture and industry,

* Continued from this *Bulletin*, 1943, vol. 13: 427-461, and 1944, vol. 16: 362-381.

improved transportation, facilitated food distribution, resettling of people and progress in sanitation, being irrelevant to the ruling families themselves, failed to have a similar effect upon them. Moreover, the impact of new ideas and of economic trends [1] inimical to feudalism favored mesalliances and precipitated birth control in the ruling families.

TABLE 1

RULING FAMILIES; AGE AT FIRST WEDDING OF MEN* BORN

Age at marriage	1480/1579	1580/1679	1680/1779	1780/1879
–14	4	1	3	—
15–19	49	52	57	10
20–24	119	124	117	116
25–29	81	118	99	153
30–39	73	117	88	103
40–49	13	27	35	29
50–59	2	7	3	7
60–69	1	1	1	—
70+ . . .	—	—	2	—
?	23	12	6	—
All ever married	365	459	411	418
Died unmarried**	212	336	241	187
Sum total	577	795	652	605

* Including mesalliances.
** At the age over 14.

In the whole period under study, of male individuals past the age of fourteen years 67% had married and 37% remained bachelors up to death. For women the corresponding values were 72.5 and 27.5 percent. In the 17th century not less than 42% of all men were permanent bachelors; in the following two centuries this percentage diminished to 37 and 31%,respectively. In these centuries the percentage of spinsters was 30 and 19%.

All these values are high as compared with present day standards in most countries,[2] and they imply that in the ruling group a) a comparatively high percentage of the reproductive potential *a priori* was put aside and eliminated from reproduction, b) that this percentage has been diminishing for the last 200 years.

[1] To be sketched in the discussion.
[2] Only in Sweden are the percentages of permanent spinsters higher than 19%.

The average age of men at their first wedding always was above 25 years; it rose from approximately 26 years in the 16th century to almost 30 years in the 19th century. On the average, bridegrooms were older than their brides, in the course of time the difference rising up to 7.5 years.

In the first two centuries each fourth bridegroom, at his first wedding, had a bride his senior in years; in the 18th century this disproportion became about half as frequent; in the 19th century only

TABLE 2

RULING FAMILIES; AVERAGE AGE OF MEN AND OF THEIR BRIDES AT THEIR FIRST WEDDING

Century of marriage	Men's age in years	Women's age in years	Difference in years
16th	25.9	20.2*	5.7*
17th	27.5	22.7	4.8
18th	27.3	21.7	5.6
19th, first half	28.4	22.2	6.2
19th, second half	29.95	22.5	7.45

* This figure is uncertain, as the age of many brides is unknown.

6.6% of the men were younger than their wives, and in the 20th century the figure dropped to 5.5%.

There has been an outspoken tendency to abolish great discrepancies in the age of the marital candidates, to delay the marriage of men up to the age of 25-30 years, and to limit the choice of brides to women below 30. By these trends as well as by the diminishing mortality there was prolonged the period of reproductive activity of first wives. Another already mentioned factor favoring reproduction in more recent centuries was the diminishing percentage of bachelors and spinsters.

In the 16th and 17th centuries, of all married men 34% had married twice at least, and over 6% married three or more times.[3] On the average each married man had had 1.42 weddings. With diminishing mortality of women in the reproductive age, remarriages

[3] Some men left a record of four to seven consecutive marriages; a few are known to have been married at the same time to more than one wife.

became less frequent. In the 18th century 22% of married men remarried, in the 19th century 18 percent.

Whereas remarriages became less usual, mesalliances, e. g. selection of a bride of low nobility or a commoner became more customary. During the first 200 years a mesalliance had happened 29 times, and following the year 1700 it happened 67 times.[4] The rapidly increasing percentage of mesalliances helped to diminish the percentage of those who remained bachelors up to their death.

TABLE 3

MEN OF RULING FAMILIES; FREQUENCY OF BACHELORS AND OF MESALLIANCES

Century	Bachelors in % of all over 15 years of age	Mesalliances in % of all first weddings of men
16th and 17th	40.9%	3.5%
18th	36.9%	5.3%
19th	30.9%	10.7%

Many a man who in past centuries would have obeyed rules of his exclusive caste and would have either married within the latter or joined a religious order or remained a pseudo-bachelor, now became influenced by modern ideas and willing to recognize legal obligations towards the companions of their choice.

All those trends, that is, less extreme age differences between marriage partners, fewer engagements in childhood, fewer marriages of adolescent boys, fewer remarriages and more mesalliances, however different their causes may have been, had a common root, namely modernization of man. Formerly, the choice of a mate was dominated by dynastic interests, family prestige and power. More and more personal choice and pursuit of personal happiness entered into consideration. This statement telescopes a development which has been slow and still runs its course. Remnants of the old customs are still alive in our days in various parts of the world, at least with regard to girls.

In some aspects of life like birth control the high aristocracy was ahead of the time, in others such as the policy of marriages the

[4] Mesalliances of female members of the ruling families were more frequent.

adaptation to modern patterns was delayed by the wealth and family tradition.

Childlessness and Life Duration

Of 100 men married to socially equal [5] women, fifteen remained childless, although many tried to remedy this by remarriage. The percentage of childless men was highly correlated with the age at wedding. For bridegrooms 20-29 years of age, the probability of

TABLE 4

MEN OF RULING FAMILIES; WEDDING AGE AND AGE AT DEATH IN RELATION TO CHILDLESSNESS

	Percentage of childless among married men		
	who became bridegrooms	who died	who were living as married*
	in this age group		
Age	A	B	C
15–19	16.7	83.3	16.7
20–29	11.6	29.8	11.6
30–39	18.6	17.3	12.4
40–59	29.6	15.3	12.4
60+..	(33.3)	12.3	8.5

* Or widowed.

childlessness was smaller than for those whose wedding age was either younger or older (Table 4, Col. A).

Childless men lived shorter than did fathers (Col. B). Apparently, a part of the responsibility for childlessness rested with the husbands. As childless men died earlier, there were fewer childless individuals among the survivors of the sixtieth year of life than among those whose life was terminated at a lower age.

Men's first marriages were childless in 19%, and their remarriages in 36 percent. As some men whose first wives were sterile succeeded in having children with their second or third spouse, the final result of remarriages was the reduction of childlessness from 19 to 15 percent.

[5] That is descendants of ruling families.

High age played but a minor role in the causation of childlessness. It was exceptional that a bachelor took a bride who was above the age of reproduction. Nor was he inclined to marry a widow or a divorcee. In 1% of all first marriages and in 4% of childless first marriages the bridegroom was at least 50 years of age.

In 8% of sterile first marriages, the woman died before she had a chance of giving birth to a viable child, that is within the first half-year of her marriage. In all other cases, that is in 92% of all, the cause of childlessness is obscure.

TABLE 5

RULING FAMILIES; AGE OF MARRIED MEN† AT DEATH AND CHILDLESSNESS

	Number of men born 1480/1679				Number of men born 1680/1879			
	Fathers	childless	II / A + B × 100		Fathers	childless	E / D + E × 100	
Age at Death	A	B	C		D	E	F	
–29	32	15	25.0		21	8	15.5	
30–39	79	22			50	5		
40–49	126	29	18.7		81	14	14.7	
50–59	157	21	16.0	11.1	115	29	22.6	15.1
60–69	148	27			156*	32*		
70+..	104	3	2.9		224**	27**	12.1	
	646	117	15.3		647***	115***	15.0	

† Excl. mesalliances.
* Incl. 12 fathers and 2 childless men who were alive in 1936.
** Incl. 16 fathers and 3 childless men who were alive in 1936.
*** Incl. 28 fathers and 5 childless men who were alive in 1936.

Nowadays, childlessness is mostly connected with woman's sterility and poor health, while the husband's role and deliberate planning are considered of secondary importance. It is difficult to obtain reliable data for the present, still more so for the past. Nevertheless, the material under study may render some insight.

In the first 200 years following the Renaissance, in ruling families the ratio of childless married men was about the same as in the more recent 200 years; 15.3 versus 15.0%. In spite of the identical averages, an age analysis reveals interesting developments with regard to childlessness.

In the first 200 years, among those who died at the age below 40, the percentage of childless men was high, namely 25%, and it declined steadily with rising age to be 3% for those who had survived the 70th birthday.[6] In the more recent 200 years, the percentage of childless married men has been unrelated to the age at which they have died (Table 5, Col. F).

The implication of these changes is that in the 16th and 17th centuries, married men's sickness often was responsible for both premature death and childlessness. Men of poor health largely were eliminated before their fifties, and of those who were unable to have offspring hardly a few lived to become more than 50 years of age. Later, in the 18th and 19th centuries, in the ruling families young men of poor health were less frequent and were cared for much more properly than earlier. They more often were able to surpass the age of fifty, thus increasing the percentage of childless couples in the age groups of 50-69 years. Simultaneously, the frequency of childlessness among the younger couples went down. The age curve of childless couples, formerly representing a slope, in more recent centuries became almost a plateau.

It is hard to say whether the smaller percentage of childless men over 70, in column F, has any significance at all. Perhaps it indicates that even since 1700 the health of men was not without importance for the frequency of childlessness. This interpretation would be in agreement with the findings regarding the number of children per man.

Number of Children

Whereas during the 400 years under study the percentage of childless men as a whole remained stable, the average number of children per father has changed. In the first two centuries each father had produced an average of 7.15 children, while in the more recent two centuries the corresponding value was 5.36 children.

On account of the rather frequent remarriages, the number of children per father was bigger than that per mother.

In the first two hundred years, each fertile woman had 5.75

[6] For all over 50 years of age the value was 11.1%.

children. This figure dropped in the 18th century to 5.0, and in the 19th century to 4.45 children ever born.

Most of the offspring came from first marriages. During the first half of the period of our study, there were born per father 5.8 children from his first spouse, and 1.3 children from all following wives. The corresponding pairs of figures for the 18th century were 4.9 and 0.9 children, and for the last of the four centuries 4.4 and 0.5 children. Per father who was married more than once, remarriages contributed

TABLE 6

RULING FAMILIES; NUMBER OF CHILDREN PER MARRIED MAN* BORN

Men's age at death	1480/1679			1680/1879		
	Number of children	Children per		Number of children	Children per	
		father	married man		father	married man
	A	B	C	D	E	F
–29	69	2.15	1.5	51	2.4	1.7
30–39	370	4.7	3.7	191	3.8	3.5
40–49	833	6.6	5.4	414	5.1	4.3
50–59	1,184	7.5	6.6	637	5.5	4.4
60–69	1,256	8.5	7.2	895	5.7	4.7
70+..	907	8.7	8.5	1,285	5.7	5.1
	4,619	7.15	6.1	3,473	5.4	4.5

* See table 5.

3.9 children during the first two hundred years, and 2.6 children during the second half of the time under study.

The contribution of remarriages to the total of offspring has in course of time diminished more rapidly than that of first marriages. Considering this we shall have to remember that the number of years of exposure to conception on the average has been increasing for the first wives and diminishing for the wives of widowers. The second factor involved has been the increasing desire for birth control which affects more those who remarried than those who married for the first time.

In the first half of our observation period the death age of fathers had a greater bearing upon the average number of children than in

the later half. In the former, according to table 6, the number of children grew from 2.15 per father who died before the 30th year of life to 8.7 per father who lived for at least 70 years. In the 18th and 19th centuries, the corresponding figures were 2.4 and 5.7 children. The age factor has lost a great deal of its significance for the number of offspring. This change largely was due to birth control and to factors that have been discussed in connection with childlessness. These factors are: increased life duration of sick young men with a poor reproductive record and diminished frequency of remarriages on account of increasing life duration of first wives.

The percentage of married men alive at 50 who were going to remarry was for the first two centuries, for the third and for the last century: 14, 13 and 9%, respectively.

In the first two hundred years, of all married men who survived the fiftieth year of life, slightly over ¼ had been remarried; for the second half of the observation period the corresponding figure was much smaller, namely ⅛th. The less frequently remarriages occur, the less are men in their middle life able to diminish the incidence of childlessness and to increase the number of their legitimate offspring. In the 19th century, increased birth control reduced further the reproductive output per married man, while man's prolonged life did not substantially contribute to an increase of the output.

In table 6, col. C and F, the number of children born—including stillborn—was related to all married men regardless of whether or not they had become fathers. On the average, we counted 6.1 children per married man in the 16th and 17th centuries, and 4.5 children in the two more recent centuries. In these figures are not included children born to men who entered into a mesalliance. Whatever their number, they did not belong any more to the ruling caste and to some extent drained the reproductive output of this group.

Correlating now the total number of children born with the total number of male individuals [7] of 15 and more years of age, we find that number to have been 3.37 for the first 200 years and 2.76 for the second half of the observation period. This implies a birth decline of 18 percent. The decline of births was partly offset by better

[7] Married plus bachelors.

care for infants and children. Thus, in the first two centuries, there were 2.15 fourteen year old children per man, while in the last two centuries the corresponding figure diminished to 2.04 survivors of the first 14 years of life. Improved care for infants and children eradicated 13 out of the 18% mentioned above, diminishing the decline to 5%.

Among persons over 14 years old, women as a rule are in the majority. This was so also in the past. The number of women per one man was 1.07 during the first two centuries and 1.09 in the more recent centuries. Thus, within the 16th and 17th centuries 2.07 persons fifteen years of age were replaced by 2.15 persons of the next generation, while in the following two hundred years the balance became negative, as a 2.09 persons' place was occupied by 2.04 members of the next generation. The deficit per person and generation amounted to 2½ percent.

It may again be stressed that men (and women) who married below their caste, are here counted as if they had not married and had no children. From the point of view of the group's reproductive balance this is correct, while putting this view aside one would have to include the offspring of the mesalliances into the calculation. I do not know the size of the error here involved. Its correction would hardly alter the results above obtained as mixed marriages are poor in progeny, regardless of whether the dividing principle is religious, racial or social.

Discussion

It is surprising how high a portion of members of the ruling families was excluded from marriage and reproduction. During the more recent centuries the percentage of marriages increased, but at the same time did the number of children per family diminish, the effect being a progressive slow shrinking of the whole group—in spite of highly improved mortality of children. Except for France, the general population has not yet arrived at this stage.

The high frequency of bachelors and spinsters in the past was not a peculiarity of the ruling caste. In medieval times many restrictions were put into the path of young people who wanted to marry. Following the discovery of America and the new way to India, resulting

in revival and expansion of commerce and production, this policy was reversed and the mercantilistic population policy initiated. For economic and militaristic reasons the rulers favored increase of their populations. Laws and customs hampering marriage were abandoned, tax exemptions and premiums for young couples were set forth, young married men were relieved of military duty, large sized families were granted subsidies, emigration was prohibited, immigration promoted, foundlings homes were created; infanticide became severely punishable and abortion [8] a capital crime; the *poena praematuri concubitus* was abolished. The formerly required payment to the clergy for the permission of sex relations during the first 72 hours was nullified. Even bigamy was tolerated for a short time after the Thirty Years War and again considered in the 18th century. The mercantilistic era knew also of house building projects by the government in order to facilitate marriage. (2).

The results of these governmental endeavors were rather poor throughout the 16th and 17th centuries. The population, decimated by frequent epidemics and famines, stagnated and partly even receded. In the second part of the 18th century, it was shown by census and vital statistical records that percentages of single persons were high and that in some parts of Europe, birth rates were low and declining (Austria, Switzerland, France). At about this time the almost 300 year old population theory which saw in men the source of prosperity and of the state's strength began to lose ground.

Some medical authorities like Johann Peter Frank (3) still adhered to the old theory demanding promotion of population growth not only by combating infant mortality, but also by increasing birth rates. However, a new political philosophy born in the 17th century (H. Grotius, Th. Hobbes, B. Spinoza, J. Locke) and taken over by the 18th century subordinated the interests of the state to the welfare of the individual. It found its expression in the American and French revolutions. New economic ideas of the physiocratic school (Cantillon, Quesnay,) shifted the point of gravity from commerce and industry to agriculture and mining; their representatives professed

[8] The study of abortion from the historical point of view, the changing moral and legal aspects, the discrepancies between actual popularity and the people's tolerance of the official condemnation by state and church, is most fascinating.

interest in population growth only in as much as society could guarantee an undiminished standard of life for the younger generation (Steuart (4)).

A few decades later, at the turn from the 18th to the 19th century, the mercantilistic views on population growth became completely reversed. Now, Malthus (5) looked upon unrestricted propagation as a cause of pestilence, vices and misery, revolutions and wars. Thus at the dawn of the industrial era, the pessimistic population views which characterized early Christianity—Tertullian—again came to the forefront. According to Malthus the population tends to grow in geometric progression, while the means of subsistence increase arithmetically.

The first half of the 19th century revived laws restricting marriage. Physicians supported the Malthusian trend and some teachers of medicine and surgery became quite ingenious in inventing safeguards for the new policy.

Thus, in order to set up a temporary barrier to intercourse and conception, Weinhold (6) wanted the prepuce of all 14 year old boys of the lower population strata to be sutured with lead wire, and governmental commissions to periodically check the preventive measure.

Malthus' theory inimical to uncontrolled population growth inspired Darwin to formulate his thesis of natural selection as the principle of evolution. Thus, Malthus became of great importance to the history of biology, but in his own field Malthus was as little successful as were the opposite views held in the mercantilistic era. Europe's population grew more rapidly than ever before, and hand in hand with it grew the cultural level and the standards of life of the population.

In the second part of the 19th century Malthusianism became repudiated by the rapidly spreading nationalistic philosophy. Only a small group of sociologists, called neo-malthusianists, tried to defend the thesis that Malthus' "law" and calculations, though wrong for the past, will prove correct in the future.

A new adversary to Malthus had now arisen in Galton's followers, the eugenists, according to whom a qualitative population policy requests also increasing birth rates. So far, this assertion has not been proven.

At the beginning of the present century speeding of population growth and prevention of population decline became the predominant aim of all concerned with population problems. In spite of international congresses of demography, policies and societies were purely nationalistic. No global or even continental planning was intended. In their aims to achieve population growth the interest was limited to the natural growth, first of all to the birth rates of the respective nation. The birth statistics of one's country were watched annually with great anxiety and compared with those of neighbors, recte enemies. Immigration, though not favored any more, was still permitted until in the years following the first World War it became greatly restricted by discriminating just against those nations which were in the greatest need. The right to emigrate was still conceded; only a few countries either forbade emigration altogether (Soviet Russia) or surrounded it with regulations which made it a tool of imperialistic expansion and intervention (Fascist Italy). In spite of mounting economic difficulties birth-promoting policies remained characteristic of the old and of the new-born states. Research on and practical application of birth control was shunned, with few exceptions (Soviet Russia and some states of the U. S. A.), and laws against abortion were enforced regardless of increasing women's suffering, morbidity and mortality. Step by step the nationalistic population philosophy became more aggressive and ruthless; it reached its pinnacle in the expulsion and wholesale murder, " genocide," of non-conationals (Nazi Germany).

The ruling families never sought for themselves an increase by " immigration " e. g. adoption of individuals from other strata. They were a small community of several hundred persons who usually married and remained within their caste. Practicing birth control for over 200 years and losing by mesalliances they were unable to hold their own, but in spite of that through the centuries they were not accumulating signs of spreading physical or mental degeneration. Their diminishing birth rates were not a biological phenomenon, but sociologically conditioned. Otherwise, the percentage of sterile couples would have increased and the mortality of infants and children would not have improved as it did. The consequences of inbreeding, as claimed by eugenists, apparently are missing. Neither did in these

families during the last 250 years the percentage of geniuses grow exceptionally nor was there any peculiar accumulation of morons and idiots. The implications for the general population are obvious.

Summary

(1) In this part of the series an analysis of 2,629 males of 15 and more years of age has been carried out.

(2) For the 400 years since the Renaissance, the percentage of married men has always been lower than it is nowadays in the general population; the lowest point was reached in the 17th century and since then the percentage has been rising. While the percentage of permanent bachelors declined, the percentage of mesalliances increased by about the same amount.

(3) Frequency of remarriages and age discrepancies between partners have been diminishing throughout the centuries.

(4) During the 400 years the average age of men at their first wedding increased from 26 to 30 years.

(5) In the more remote centuries childless couples prevailingly were young, as they had a considerably higher mortality than fertile couples. Later on childless men more frequently grew to become over 50 years of age. Yet throughout the centuries the average percentage of childless married men remained on the same level, 15% of all. In the first 200 years men's health status was more responsible for childlessness than later.

(6) Remarriages have been childless more often than first marriages.

(7) On the average a man who married had 6.1 and 4.6 children, respectively, depending on whether he was born in the first or in the last two centuries. For the average father the corresponding values were 7.1 and 5.6 children.

(8) In the first 300 years remarriages increased the total offspring of a generation by 18%, and in the 19th century by 11%.

(9) In the first 200 years each person 15 years of age was replaced by 1.04 persons of the next generation, while in the more recent two centuries the corresponding value was 0.98; an increase per generation by 4% thus gave way to a decline by 2%. Whereas during the 18th and 19th centuries the general population was growing, the ruling group numerically was declining. Effectively planned birth control in these families started much earlier than in the general population. Birth control and mesalliances caused shrinking of the caste since 1700.

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F. Men's Mortality

During the last decades the distribution of the population according to age has been considerably altered; children became fewer and old persons more numerous. This international phenomenon poses a variety of problems upon science.

Preventive and curative medicine for the last century progressed by leaps and bounds and became a most potent weapon against diseases menacing man from birth up to the age of about 50, but were not successful in combating mortality of the old. Except for Lister's (1) contribution (1867) it is only in the last twenty years that the aged have been markedly benefiting from medical discoveries. Insulin, sulfa drugs, penicillin, improved anesthesia service, blood transfusions and other peri-operative devices help to prevent premature death of the aged. In the same direction, though less dramatically have been acting: personal hygiene, dental work, proper care for eyes, ears and orthopedic disabilities etc., all of which prolong life by preserving health and by prolonging enjoyment of life. However, the fact remains that as yet no approach exists to the core of the problem of aging.

First there is but little reliable information about the influence of heredity, nutrition, work, hormonal secretion, metabolism and of changes in the rate of tissue renewal and in the proportion of young to old tissue, upon man's *physiological* aging. In the 1880's Charles S. Minot (2) discovered that senescence depends on the increase of the ratio of the cell protoplasm to the cell nucleus and on the differentiation of cells. He found a positive correlation between the rate of growth and age of maturation on one hand and the process of aging and duration of life on the other. But his early statistical generalization failed after decades of study to show how life could be prolonged. In the meantime facts became known about changes in the age of maturation of girls which put in doubt Minot's rule.[1]

Second, we fail to comprehend *pathological* aging by degenerative diseases. The morphological work made great strides, indeed, since Johannes Müller (3) and Rudolf Virchow (4), but as to patho-

[1] Although girls mature much earlier than in the past, their life expectancy grows.

genesis and etiology, no substantial progress has been made for the last 100 years. Most probably a number of misconceptions will have to be eliminated before geriatrics will be able to substitute a higher norm for the Biblical goal of " three score and ten." The historical analysis of mortality may help us to realize some misconceptions.

Mortality of Males 15-49 Years of Age

At the dawn of the present century it became obvious that in all civilized countries the mortality of persons from 15 to 49 years of age has been responding well to the conditions of life and work as they improved and to the developments in the fields of hygiene and medicine. The first world war with its epidemics, hunger and revolutions interrupted the favorable trend for a few years only. In spite of economic depression in huge areas, progress in health standards was resumed after the war at an increased pace.

The rapid reduction of mortality during the last sixty to seventy years was foreshadowed by steady though slow improvements in the 18th and 19th century.

In the century of the Thirty Years War most age specific death rates of men between 15 and 49 were higher than in the preceding 16th century or later, but as shown here, this increase was apparently much smaller than anticipated on the basis of historical descriptions. Among men of ruling families born between 1780 and 1879, the age specific death rates on the average were lower by 55% than were the corresponding death rates in the 17th century (Table 1, Col. D and B). This is a substantial improvement.

Compared with the figures for the ruling families in Col. D, those of white Americans in 1940 are much more favorable in the ages of 15-34 (Table 1, Col. F versus D) and only slightly better in the ages 35 to 49 years. In these age groups, mortality rates of colored men are even higher than those for men of the ruling families born 1780/1879.

The time gap between columns D and E varies with the age, diminishing on the average from about 93 years in the youngest to 63 years in the highest age group of Table 1. Were it only a question of a diminishing time interval, the differences in mortality would have dwindled evenly and slowly with the rising age of men. In reality, however, they changed abruptly. Thus the time gap cannot be the whole explanation.

In the ruling caste, men between 35 and 49 always had lower death rates than younger men had. How unfavorable the latter's death rates were, we learn by considering them in conjunction with data on American Negroes (Col. E).

In the 16th century more than every second fifteen-year-old boy (exactly 55.6%) died before his 50th birthday. In the following century the situation deteriorated slightly as the percentage of dead rose to 58.4%. With this the peak was reached. In the 18th and

TABLE 1

MEN; TOTAL AGE SPECIFIC MORTALITY PER 100

Age at death in years	Ruling Families; Men born				U. S. A., 1939/1941	
	1480/1579	1580/1679	1680/1779	1780/1879	Colored	Whites
	A	B	C	D	E	F
	of 100 men who had entered the respective age group, died in it					
15–	3.8	9.0	4.3	2.95	1.85	0.85
20–	8.7	11.8	9.25	4.70	3.15	1.15
25–	11.6	8.8	6.7	4.45	3.65	1.25
30–	7.7	11.35	7.4	6.15	4.65	1.55
35–	9.2	10.85	8.15	2.4	5.75	2.05
40–	11.6	9.35	8.2	4.1	7.45	3.0
45–49	14.75	16.9	10.4	6.2	10.15	4.45
15–49	55.6	58.4	43.4	27.3	31.7	13.5

19th centuries the death rate diminished more and more so that approximately every fourth boy fifteen years of age succumbed before having traversed the following 35 years of life. The corresponding value for Negroes in the United States (in 1939/1941) is less favorable, while that for whites is much better, namely 13.5% (See Table 1).

Mortality of Men 50 and Over

During the 19th century the mortality of men over fifty years of age responded rather weakly to social and medical progress. In some countries, like England around 1900, death rates of persons over fifty differed but little from those fifty to sixty years earlier, that is

at a time when Virchow had just started his epoch-making contributions to pathology, and when Pasteur, Lister, Koch and Billroth were still unknown. In these 60 years endeavors to improve the health of the general population had not been missing. In 1842 a report on " Sanitary Conditions of the Laboring Population of Great

TABLE 2

ENGLAND AND WALES; ANNUAL AGE SPECIFIC DEATH RATES PER 1,000 MEN

	A	B	C	D	E
Age	1841/1850	1891/1900	1911/1914	1931/1935	Gain $\frac{A-D}{A}$ 100
15–	7.1	3.1	2.9	2.4	67%
20–	9.5	4.2	3.7	3.2	66%
25–	9.9	5.6	4.8	3.3	67%
35–	12.9	9.2	8.2	5.4	58%
45–	18.2	16.2	15.0	11.2	38%
55–	31.8	31.8	30.5	23.5	26%
65–	67.5	64.8	64.6	56.8	16%
75–	148.3	137.7	139.3	135.2	10%
85–	312.3	279.2	273.4	278.8	11%

TABLE 3

NORWAY; ANNUAL AGE SPECIFIC DEATH RATES PER 1,000 MEN

Age	1801/1805	1881/1892	Gain in %
30–	13	8	38
40–	18	10	44
50–	31	17	45
60–80	74	46	38

Britain " had been presented to Parliament, in 1844 the Health of Towns Commission was founded and in 1848 the Board of Health. All this was without much influence upon the death rates of the older persons (Table 2). The first years of the present century did not considerably alter the situation.

Among the few countries with statistics available for the 19th century, only Norway (Table 3) had a record of strongly diminish-

ing death rates in the age groups 50 to 80 years while in Sweden or Germany the improvement was slow.

With the realization of the high age groups presenting a problem *sui generis*, attention has been directed to cancer, cardiovascular disturbances and diabetes. In the early years of the present century, most scientists believed these diseases to be on a rapid increase, the reason being the cumulative mental and emotional strain, the hardships and hazards of life wrought by urbanization and industrialization which bear more heavily upon men in middle life and older than upon young men.

Provided the pressure of modern life is the main cause of the spread of degenerative diseases we would have to conclude, first, that during the time between 1500 and 1800, in comparable age groups, degenerative diseases were less common than at present. Second, since in middle and old age degenerative diseases provide the bulk of the causes of death, prematurely terminating life, the death rates of the aged in the past should have been rather low as compared with present standards.

To the first presumptive conclusion we shall return later, in the discussion; here it may be stated only that it is improbable.

As to the second conclusion, it is evident from Table 4 that it is in disagreement with reality; in the past, mortality of men older than fifty was much higher than at present and has been continuously improving.

There is no deterioration of rates in Table 4 Col. B, similar to that in men between 15 and 49 years of age (see Table 1). This is no contradiction. Of men who, in the time of the Thirty Years War, 1618-1648, were 15/49 years of age, very few were born prior to 1579. On the other hand, of those who, during this war were over fifty years old, evidently most were born prior to 1579. Therefore the devastating impact of this war upon men over fifty was felt stronger in Col. A than in Col. B and the difference must have been more pronounced in the aged than in the middle-aged persons. This fact is only slightly reflected in the figures of Table 4. Comparing corresponding groups of column A and B with one another, the decline in mortality amounted on the average to 23% with slight variations in the single age groups.

TABLE 4

TOTAL† AGE SPECIFIC MORTALITY PER 100 MEN WHO ENTERED THE RESPECTIVE AGE GROUP

Age in years	Ruling Families; Men born				U. S. A.; 1939/1941	
	1480/1579	1580/1679	1680/1779	1780/1879	Colored	Whites
	A	B	C	D	E	F
50–	26.0	22.7	13.8	7.95	13.35	6.65
55–	24.2	18.8	17.85	16.55	16.4	9.9
60–	40.6	29.6	24.05	15.15	19.3	14.0
65–	47.55	37.5	36.65	26.4	22.9	19.85
50–69	82.5	72.4	65.9	56.1	55.0	41.95
70–	60.5	46.3	36.5	36.25	28.9	28.5
75–	88.25	58.8	55.0	46.5	37.35	40.55
80–	100.0	76.2	66.65	51.8	47.1	54.6
85–	—	100.0	83.3	70.85	55.95	58.8
90+	—	—	100.0	100.00	66.1	80.35

† In the age above 50 the cohort of living men has diminished rather fast with each year. Thus a fifth of each rate from this table would widely differ from annual death rates calculated for the actual number of person-years in the respective age groups.

TABLE 5

MEN; ANNUAL AGE SPECIFIC DEATH RATES

Age in years	Ruling Families; Number of Deaths per 100 Actual Person-Years of Men Born						U. S. A. men in
	1480/1479		1580/1679	1680/1779	1780/1879		1940**
	A		B	C	D		E
45–	3.0	4.75	3.7	2.2	1.3	1.45	1.25
50–	6.0		5.1	3.0	1.7		
55–	5.5	7.5	4.2	3.9	3.6	3.5	2.6
60–	10.8		6.95	5.5	3.3		
65–	12.5	14.1	9.2	9.0	6.1	7.2*	5.4
70–	17.3		12.05	8.9	8.9		
75–	31.85	33.0	16.7	15.2	12.1	12.8*	12.15
80–	(50.0)		24.6	20.0	14.4		
85–	—		(55.5)	27.3	32.9	33.9*	24.4
90+	—		—	(60.0)	(50.0)		

* The final values will be lower.

** According to table 80 of Statistical Abstracts of U. S. 1944/1945.

More pronounced become the differences when the death rates are related to actual person-years within each age-group. Then for the age-groups of 50-84, in Column B, we find a decline of mortality by 15, 14, 36, 26, 31, 47 and 51% respectively (see Table 5).

The high mortality of the aged during the decades of a war which retarded Europe's development for a long period was not due to battle casualties.[2] But although more protected against the raging epidemics than city dwellers, and less exposed to famine, to looting and ransacking by the vagabonding soldatesca than the peasantry, the aged men of the ruling caste apparently suffered more than they were able to withstand and more than did women of their caste and age.

For the 50 to 80-year-old men within four centuries mortality rates diminished by 72,[3] 35, 70, 51, 49 and 62%,[4] respectively.

Confronting mortality rates of the most recent group of the ruling families with American data for 1939/1941 Table 4 (Col. E and F) and Table 5 (Col. E) we must recall the peculiarities in the construction of the columns. In those referring to the ruling families, the men were grouped according to the time (century) of birth, while in the columns referring to Americans, the material, conforming with the usual mortality statistics, has been grouped according to the calendar year of death.[5]

The shorter the time interval for a comparable pair of values, the smaller should be the difference between these two values and the closer should be the respective death rates. This however does not coincide with our findings.

As compared with the most recent column of men of the ruling families (Col. D), mortality of 50-69 or to 74-year-old white men in the United States is lower by one-fourth.

[2] See chapter on unnatural deaths.

[3] 50-54 years of age.

[4] 75-79 years of age.

[5] The death rate for 50 to 54-year-old men in Col. D concerns persons whose death occurred during a period of 100 years, with the focal point around 1881, while in the corresponding group of persons of Col. F, death occurred during three years centered around 1940. Between those two foci there is a time lag of 59 years. For those who died at the age of 55-59 years the time lag amounted to 54 years; if death occurred at the age of 70-74 the average time interval was 39 years only (foci in 1901 and 1940) and so on.

For the age groups between 75-89 years the differences are smaller, namely: -5 and +17, respectively (See Table 4).

To assess the progress for men over fifty since 1500, we note that in 1939-1941 white Americans 50-79 years of age had death rates not higher than 25, 41, 34, 42, 47 and 46%, respectively, of those for men born in 1480-1579 (Col. A, Table 4). Even for persons over 70 mortality has been more than halved.

Compared with men of the ruling families, American colored men were worse off in the age of 50-64, but above that age the reverse seems true, Negroes having lower death rates.[6]

The comparison between colored Americans, white Americans and men of the ruling families indicates that the mortality level for the aged depends to a large extent on the selective conditions in earlier decades of life. This may be a clue to the understanding of the unfavorable developments in mortality of the aged in England during the second half of the 19th and the beginning of the present century. Our study shows that England's pattern of response at that time was transitory, connecting a period of slow but steady improvement for several centuries with the recent period of rapid progress.

Marital Status, Childlessness and Death Rates

Usually mortality of bachelors surpasses that of married men and is about equal to that of widowers. Those bachelors whose physical or mental health has been failing for a long time do not marry at all or do it late. Some of the chronic diseases like tuberculosis or rheumatic fever end the lives of their victims in younger years; others like syphilis, nephritis, and chronic alcoholism are more likely to select their victims from the ranks of persons over 40. Sometimes these diseases are a reason for avoiding marriage and sometimes they are in turn aggravated by persistent bachelorhood. Marital status has also an influence upon frequency of suicide and other unnatural deaths.

Averaging the four centuries, bachelors had higher age specific death rates than men who had been married. Studying each century

[6] Colored apparently have also lower death rates than white Americans in the age groups 75 and more.

TABLE 6

RULING FAMILIES; MARITAL STATUS AND ANNUAL MORTALITY PER HUNDRED PERSON-YEARS

Age of death in years	Of Men Born In							
	1480/1579		1580/1679		1680/1779		1780/1879	
	bachelors	ever married	bachelors	ever married	bachelors	ever married	bachelors	ever married
15–	0.66	3.62	1.84	—	0.88	0.64	0.60	—
20–	1.94	1.37	2.71	1.62	2.18	1.07	1.30	0.59
25–	2.92	1.88	2.35	1.07	1.63	1.07	0.92	0.91
30–	2.23	1.58	3.28	1.77	2.06	1.12	1.82	0.87
35–	2.41	2.49	3.09	1.97	2.12	1.48	1.01	0.24
40–	3.11	3.21	1.92	2.05	1.85	1.66	1.18	0.72
45–49	3.06	3.80	3.44	3.77	1.68	2.36	1.00	1.35

TABLE 7

MEN OF RULING FAMILIES, BORN 1480 TO 1879. ANNUAL MORTALITY RATES PER 100 PERSON-YEARS

Age in years	Bachelors	Men ever married		
		Childless	Fathers	All
15–	1.06	*8.3*	0.3	1.44
20–	1.98	*3.6*	1.0	1.23
25–	1.89	*3.3*	1.0	1.22
30–	*2.26*	1.6	1.3	1.33
35–	2.13	*2.4*	1.4	1.48
40–	1.95	*3.6*	1.6	1.78
45–	2.18	2.8	2.7	2.66
50–	*4.00*	3.3	3.5	3.41
55–	4.41	*4.9*	3.8	3.93
60–	5.31	*7.4*	5.4	5.65
65–	9.12	*11.7*	7.4	7.86
70–	*12.73*	12.5	9.5	9.67
75–	*17.36*	9.2	15.0	14.44
80–84	(11.11)	10.0	*21.1*	19.39

by itself one finds many exceptions to this rule, perhaps for two reasons; one being the small groups and second, the fact that in our tables widowers were not separated from the married. Between 15 and 45 years of age bachelors had death rates higher than those of married men in the last three centuries, but not in all age groups of the first century (Table 6).

In the century of the Thirty Years War, the change for the worse affected young bachelors much more than any others. Above the age of 45 the differences between bachelors and the others were small and irregular (Table 7).

Generally speaking, men whose first marriage remained childless to the age of 74 had higher death rates than those exhibited by fathers as well as by bachelors in corresponding age groups. Especially high was the death toll of childless married men in the age of 15-29. In other age groups the deviations in favor of bachelors were either small or zero. Between the rates of bachelors and fathers the differences in favor of the latter were outspoken in the age groups of 15-39 only.

From Table 7 we may infer that young men who married and became fathers were healthier than the average of bachelors, whereas among childless married men there was a relatively large group of sickly individuals. Bachelors have lost to the group of fathers their healthier members, while to the childless married men they have lost a mixture consisting mainly of the healthy, who happened to be wed to sterile women or to women who died before being able to deliver a child, of chronically sick, whose life expectancy was small, and of men who died soon after their wedding either of an acute infectious disease or as a war casualty. The number of the latter was small. Of those who died in the age of 15-29 years there were killed in battle (a) 66 out of 441 bachelors, that is 15.0%; (b) 3 of 132 childless married men, that is 2.3%; and (c) out of 930 fathers also three, that is 0.3%. In the age groups above 30 years, only one childless married man was killed in battle, while of the fathers, 30 were killed, and of the shrinking group of bachelors 28 fell. The bachelors had to bear the brunt of family feuds and wars not only in younger years but also in the age above 30.

Gain in Longevity

In the 16th century out of 100 fifteen-year-old boys 44.4, that is less than each second individual, reached the mature age of 50 years, and only 7.8% reached the Biblical age of three score and ten. Of those alive at 70, six-tenths died within the next five years. At 75 years of age there were alive but 3.1% of the fifteen-year-old boys (see Table 8). During the following centuries, the survival values had improved considerably.

TABLE 8

RULING FAMILIES; NUMBER OF MALE SURVIVORS ACCORDING TO THE CENTURY AT BIRTH

	Alive at the age of					
Born in	15	50	70	75	80	85
1480/1579	554[1]	246	43	17	2	—
1580/1679	789	328	95	51	21	5
1680/1779	652	370	126	80	36	12
1780/1879	605	440	206[2]	123[3]	61[4]	27[5]

[1] Plus 23 men who later died at unknown age.
[2] Out of 585 men; 20 being too young in 1936.
[3] Out of 576 men; 29 being too young in 1936.
[4] Out of 571 men; 34 being too young in 1936.
[5] Out of 568 men; 37 being too young in 1936.

Comparing 1480-1579 with 1780-1879, and starting with the age of 15 years we find for the age of 50 years survivors in 44.4% and 72.7%, respectively; at the age of 70 years, in 7.8% and 35.2%; and at 75 years we find them in 3.1% and 21.3% (see Table 9). At the age of 50, the gain of lives amounted to 63%, at 70 years to 351% and at the age of 75 the gain reached the height of 587%.

At present, the values reached by white Americans are still more favorable. Compared with the expectancy of 15-year-old boys of ruling families in the 16th century, the percentage of survivors at the age of 50 changed as 1 : 2, of those at 70 years as 1 : 6 and of those at 75 as 1 : 11 (see lowest line in Table 9).

In the 16th century, of men 50 years old, 17.4% survived the following twenty years, and only 0.8% became octogenarians. For

men born 300 years later, the corresponding survival ratios were 49.0% and 15.0%, implying an improvement of 181% and of 1,775% respectively. Whereas in the 16th century, out of nine 75-year-old men only one managed to live five or more years, three centuries later, in the same social group, this proportion improved to one out of two men. This is a great progress indeed. Nevertheless

TABLE 9

SURVIVAL RATES IN PERCENT OF MEN ALIVE AT 15, 50 AND 70 YEARS OF AGE

	Of 100 Men alive at the age of							
	15 years			50 years			70 years	
	have reached the age of							
	50	70	75	70	75	80	80	85
	A) Men of the Ruling Families, born							
a) 1480/1579	44.4	7.8	3.1	17.4	6.9	0.8	4.7	—
b) 1580/1679	41.6	12.0	6.5	28.9	15.5	6.4	22.1	5.2
c) 1680/1779	56.7	22.4	12.2	34.1	21.6	9.7	28.5	9.5
d) 1780/1879	72.7	35.2	21.3	49.0	29.9	15.0	32.3	14.3
	B) Men of U. S. A., who died in 1939/1941*							
e) Colored	68.3	30.7	21.8	45.0	32.1	21.4	44.7	23.6
f) Whites	86.5	50.2	35.9	58.0	41.5	24.7	42.4	19.3
a : f	1 : 2	1 : 6	1 : 11	1 : 3	1 : 6	1 : 30	1 : 9	0 : 19

* Calculated from official Life Tables (Statistical Abstracts of the U. S.).

these values are far from being the optimum mankind can achieve or has achieved so far. Thus, fifteen per cent of the men in the ruling caste, born 1780-1879 and fifty years of age, became octogenarians, while in the United States the corresponding value (see Table 9) for Negroes born between 1835/1846 is 21.4% and for whites 24.7%.

To evaluate properly the improvements during the years of senility we may focus attention on the two columns at the right end of Table 9. Of 100 men of the ruling caste, born 1480-1579 and 70 years of age, less than five happened to live for another ten years, and none succeeded in becoming 85 years of age. Three hundred years later,

of 100 septuagenarian men, 32.3% became octogenarians and 14.3% survived their 85th birthday. The corresponding survival rates for American male Negroes in 1939-1941 supposedly were 44.7 and 23.6%, while for white men they were 42.4 and 19.3%, respectively.

Studying longevity one wants to know not only how many of 100 persons of a given age will reach a certain other age, but also their total future life expectancy. The future lifespan of persons at 15, at 50 and at 70 will be shown in Table 15, where men's chances will be compared with those of women. Here it may be only mentioned that in ruling families the future lifespan of 15-year-old boys improved from 31.5 to 43.7 years, that of 50-year-old men from 12.0 to 18.7 years and that of 70-year-old men from 4.7 to 7 years. The improvements amounted to 38, 56 and 49% respectively.

It is customary to measure progress by pointing out the increase in the life expectancy of newborns. However, this method may lead to misinterpretation when a study covers periods as long as several centuries. The medico-historian is likely to overlook the paradox that at present the newborn on the average lives shorter than a 3 to 4-year-old child (but longer than any individual older than this) while in the past—it is enough to go back about 50 years [7]—the newborn's average life-expectancy was even shorter than that of a 14 to 15-year-old individual.

According to Table 10 the life expectancy of a newborn increased from 30 to about 63, that is by around 110%, while that of a 15-year-old boy increased from 31.5 to 52 years, that is by 66% only. Calling the first 15 years of life the period of dependency and the following years the period of productivity, we must not conclude that the increase of life duration of a newborn, as shown in Table 10, is entirely a matter of the productive period.[8] The latter did not increase by the

[7] In general population statistics.

[8] Such a mistaken interpretation is found, for instance, in H. W. Haggard's widely read book (5): "Variation in length of life does not affect the length of the dependent period. It affects only the period of productivity. Thus a dependent period of 15 years leaves for an average life of 20 years only 5 years of productivity. For an average life of 60 years, approximately that in civilized countries today, the dependent period remaining the same, leaves a productive period of 45 years. Thus a threefold increase in the average length of life results in a ninefold increase in productivity. . . ." p. 190, Chapter "Black Death."

difference between (30-15) and (62.8-15), that is from 15 to 47.8 years, but by 52.3—31.5 = 20.8 years. The reason is that the average life duration of a newborn as *a child*—taking 15 years as the borderline—was never 15 years, but in the 16th century less than 9 years, in the 19th (in the ruling families) 12.4, and now in the United States is 14.1, that is still less than 15 years.

TABLE 10

THE FUTURE LIFE SPAN OF A BOY AT THE AGE

	Of	
	0	15
	Years	
Ruling families		
1480/1579	30.0	31.5
1780/1879	49.5	43.7
Germany, Life Table		
1871/1881	35.6	42.4
England, Life Table		
1881/1890	43.7	44.5
U. S. Whites, Life Table		
1939/1941	62.8	52.3

Men and Women

Throughout the entire period under study, men's death rates were higher than those of women. Thus, of boys and girls fifteen years of age in the 16th century 55.6% and 45.5%, respectively, died before they became 50 years old; in the 17th century the corresponding pair of figures was 58.4% and 46.3%; in the 18th century 43.4% and 37.3%, and in the 19th century 27.3% and 26.5%, respectively. In the 19th century the difference between the two sexes diminished from the former 10 to a bare 1%.

As demonstrated in Table 1, men's death rates in the age of 15-34 years improved but little, while in the age of 35-49 there was considerable progress. In women (see Table 11) the changes were principally the same; there was but little improvement in the age of 15-24; the record was better for the following decade of life and considerably more so in the age of 35-49 years. In recent times (see

American data Table 11) the retardation of progress in persons 15-29 years of age has been completely overcome.

Another point of interest is that at present the differences in mortality between white and colored Americans of 15-49 years of age are bigger than were the changes betwen 1480-1579 and 1780-1879 in the ruling families.

The third point regards the shape of the mortality curves in Tables 1 and 11. We are confronted with two patterns. One of them, familiar to students of current statistics, existed also in the first

TABLE 11

WOMEN. TOTAL AGE SPECIFIC MORTALITY PER 100

Age at death in years	Ruling families; Women born				U. S. A.; 1939/1941	
	1480–1579	1580–1679	1680–1779	1780–1879	Colored	Whites
	Of 100 Women who had entered the respective age group, died in it					
15–	4.4	4.2	3.9	4.2	2.0	0.6
20–	5.3	5.7	5.9	4.2	2.9	0.8
25–	8.8	7.1	6.7	4.4	3.3	1.0
30–	6.4	8.85	7.1	5.1	3.95	1.2
35–	9.5	9.4	6.7	4.2	5.0	1.5
40–	11.7	11.6	7.0	3.8	6.5	2.1
45–49	15.0	12.3	7.7	4.2	8.8	3.0
15–49	45.5	46.3	37.3	26.5	28.4	9.8

century of our study. Mortality was then, as it is now, rising steeply from age to age group, at the end of the forties being four to six times as high as in the teens.

In the 17th and 18th centuries, the death rates of 35 to 49-year-old persons yielded more strongly to the improvement in living conditions, while the younger age groups remained unprotected against infectious diseases including puerperal fever and against war fatalities. Thus the differences in the death rates between 15-34 and those of 35 to 49-year-old persons gradually diminished until the 19th century a transitory pattern developed in which mortality of the younger was either equal or even higher than that of the older persons. It was only in the second half of the 19th century that modern medicine, especially the achievements of Semmelweis, Pasteur and Koch, combined with

improved social conditions and the relatively little disturbed period of peace removed the high risks of past centuries from young persons. With this change, the mortality curve for the 15 to 49-year-old persons became steep again. An illustration of the most recent phase of these developments is provided by the statistics of England (Table 12.)

As to the middle age, 50-69 years, male death rates always—except for those born in 1580-1679—have been much higher than those of women. Comparing those born 1480-1579 with those born 1780-1879 the death rates of 50 to 69-year-old males improved by about

TABLE 12

ENGLAND AND WALES. ANNUAL AGE SPECIFIC MORTALITY PER 100

Age in Years	1841–1850		1901–1910		1937	
	Men	Women	Men	Women	Men	Women
15–19	0.7	0.8	0.3	0.3	0.21	0.18
20–24	0.95	0.9	0.4	0.35	0.28	0.26
24–34	1.0	1.1	0.6	0.5	0.31	0.28
35–44	1.3	1.3	0.9	0.75	0.50	0.40
45–49	1.8	1.6	1.6	1.25	0.87	0.62
50–54					1.36	0.91

as much as those of women (33 and 34%), while starting with those born 1580-1679 the death rates of males diminished by 22.5% and those of women by 35.4%. Thus during the last 200 years the difference between the death rates of both sexes increased considerably (Table 13).

In the age of 50-69, the present death rates of white Americans are much less ahead of those of the ruling families than they are in younger age. In the most recent column of the ruling caste, of 50-year-old men and women, 56.1 and 45.7%, respectively, had died prior to the age of 70, while for the Negroes in the United States the corresponding figures were 55.0 and 50.15%, and for whites 42.0 and 31.6%.

In both men and women over 70 throughout the centuries the death risk was diminishing, always being higher in men. In the aged, the difference due to sex is far bigger than in middle years of life or in young persons.

TABLE 13

WOMEN. TOTAL AGE SPECIFIC MORTALITY PER 100

	Women of Ruling Families born				U. S. A.; 1939–1941	
	1480–	1580–	1680–	1780–1879	Colored	Whites
	Of 100 Women who had entered the respective age group, died in it					
Age	A	B	C	D	E	F
50–	13.65	17.5	12.6	5.6	11.7	4.4
55–	24.65	21.5	15.4	10.4	14.55	6.5
60–	32.7	26.3	18.8	13.3	17.3	9.9
65–	29.4	38.6	27.2	16.6	20.2	15.05
50–69	69.1	70.7	56.3	45.7	50.15	31.6
70–	48.05	40.9	41.9	24.2	24.3	23.4
75–	52.5	56.0	42.6	32.9	30.5	30.5
80–	47.4	66.0	69.7	51.0	37.7	49.8
85–89	80.0	90.9	75.0	52.8	46.8	65.05

TABLE 14

RULING FAMILIES; AVERAGE NUMBER OF YEARS LIVED* PER PERSON 15 YEARS OF AGE

In the Age Group	A Man born in				A Woman born in			
	1480–	1580–	1680–	1780–1879	1480–	1580–	1680–	1780–1879
	lived years				lived years			
15–49	26.2	24.7	27.4	30.1	27.7	28.2	28.5	30.1
50–69	5.0	5.4	7.9	11.1	6.8	7.0	9.1	11.95
70+..	0.36	0.78	1.5	2.5	1.16	1.14	2.1	3.5
15 and more	31.55	30.9	36.8	43.7	35.65	36.3	39.7	45.6

* In each of the 3 age groups of this table.

TABLE 15

RULING FAMILIES; AVERAGE FUTURE LIFE SPAN IN YEARS

At the Age of	For Men born in				For Women born in			
	1480–	1580–	1680–	1780–1879	1480–	1580–	1680–	1780–1879
15 years	31.5	30.9	36.8	43.7	35.6	36.3	39.7	45.6
50 years	12.0	14.9	16.5	18.7	14.6	15.1	17.8	21.0
70 years	4.7	6.5	6.6	7.0	6.8	7.2	7.7	8.8

In the most recent column of the ruling families, 70-year-old men and women on the average lived 7.7 and 8.8 years respectively while the corresponding values in this country, in 1940, were 9.4 and 10.5 years for whites, and 10.1 and 11.8 years for Negroes.

The whole gain in life for persons who survived childhood may be demonstrated in Tables 14 and 15.

In the 16th century boys 15 years old on the average had a future life span of 31.5 years, while girls had an expectancy of 35.6 years. These values are only by 3 years bigger than was estimated by Ulpianus (6) for 15-year-old boys and girls in ancient Rome. After one and a half millennia there was but little improvement in the future life span of a 15-year-old individual, and since the ruling families were better off than the average of their contemporaries, it may be inferred that for the general population there was no improvement at all. But then things began to move: the life expectancy of members of the ruling groups most probably improving earlier than that of the general population.

Within four centuries the future life span of a fifteen-year-old male individual of the ruling families improved from 31.5 to 43.7 years. The most recent value for boys was smaller than it was in the 1880's for an English boy (by 0.8 years) or for a boy in Norway (by 3.7 years); it was identical with that of United States Negroes in 1939-1941 but by 8.6 years short of the expectation of white American boys. The future life span of girls 15 years of age born 1780-1879 was 0.5 years short of that of Negro girls, and 10.5 years short of that of white American girls in 1939-1941.[9] Generally speaking, the life expectancy of 15-year-old individuals in four centuries increased about as much as it increased in the course of the last half century.

While according to Ulpianus men and women 50 years of age lived another 10.5 years, the corresponding figures for persons of ruling families were 12 (♂) and 14.6 (♀) years, and 300 years later 18.7 and 21.0 years, respectively. This is almost twice the value for ancient Rome. Thus within the 400 years under study the life span of 50-year-old men expanded by 6.7 years or by 56%, and

[9] In the 1880s, the corresponding values for England were 46.5 and for Norway 49.6 years. These values are by 9.6 years and 6.1 years respectively, shorter than those for American white girls in 1939-1941.

that for women by 6.4 years, that is by 44%. The average future life time of white Americans at 50 is now (1940): 22.0 and 24.7 years. Again it is safe to assume that the figures for the ruling families in the 16th century surpassed those of their contemporaries. After one and a half millennia life expectancy started to improve, now, in 1940, being more than doubled.

Since 1500, life expectancy of 70-year-old men increased from 4.7 to 7 years that is by 50%, and that of women from 6.8 to 8.8 years that is by 29%.[10] In the United States, in 1940 the future life span of white men and women 70 years of age was 9.4 and 10.5 years (and for Negroes 10.1 and 11.8 years, respectively). Including now the experience of this country up to 1940 we may say that since the middle of the 16th century 70-year-old men have gained an average of 4.7 years of life, at least fully doubling their future life span, while for white women the corresponding figure was at least 3.7 years or 54.4%. In these as well as in the middle years of life the developments in men differed from those in women. In the 17th century life expectancy of men of 50 or 70 years of age was only a little smaller than that of women; since then the difference has increased and thus in the age-group 50-70 the difference between the two sexes had a tendency to widen while in the age of 15-50 years the difference became narrow.

Owing to the unequal developments in the age specific mortality rates, the age distribution of the population has been in constant transformation. (Graph I). The age pyramid of remote times was steep and rapidly narrowing; the sides of the pyramid were caving in. Now the age structure is that of a bell. In the 16th century, half of the males were dead before the 26th year of life was over; in the 18th century that dividing line was raised up to the age of 36 years and in the 19th century up to the age of 55 years. These were the values for men of the ruling families. Now, in the U. S. A., according to the Life Tables for 1940, of white men fifty percent would survive the age of 68 years.

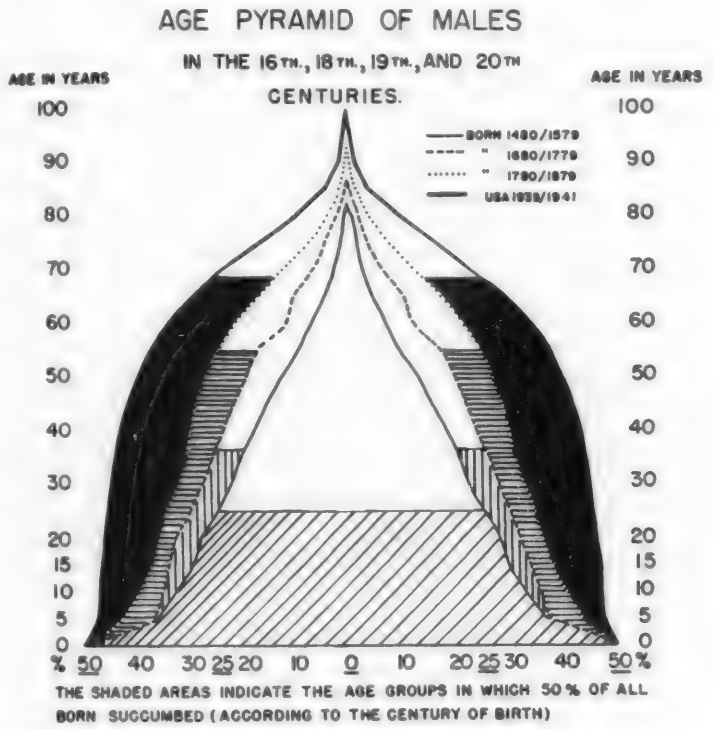
The developments in the female part of the population were even more outspoken. Perhaps, neither a numerical nor a verbal presen-

[10] Of 15-year-old girls were alive at 70: 16.9, 15.7, 27.4 and 39.9%; the corresponding values for men see sub *Gain of Longevity*.

tation is apt so vividly to demonstrate the historical transmutations in the age structure of human society during the last few centuries as graph I.

Unnatural Deaths

Commenting on the high mortality of men below 35, I hinted at unnatural deaths as a contributing factor.



Very little is known about the frequency of deaths by violence in previous centuries. According to a study on Denmark's aristocracy, of 1749 male deaths that occurred between 1530 and 1679, only 24 (equal to 1.4%) were unnatural, and only one, that is 0.6% was a suicide (Westergaard) (10). I doubt the reliability of these and

similar figures, as in persons for whom riding, hunting and fighting were essential, one would expect more accidental deaths.

In the 19th century, the incidence of unnatural deaths was prompted by industrialization, developments of chemistry, mechanization of traffic, rapid growth of cities. Other factors tended to curb accidental deaths. To these factors belong combat of natural catastrophies by rising density of settlements, technical improvements, river regulations and fire ordinances in the cities; second, increasing educational level of the population enabling them to cope more intelligently with new tools and power-driven machinery; and finally, humanitarian tendencies symbolized by the Geneva Convention (1864). In the end, the balance probably became less favorable, but exact statements are difficult because of the questionable comparability of the data on unnatural deaths.

In the statistical records the term unnatural death sometimes was given a broader and at another time a narrower interpretation. With regard to homicide, suicide, war and duel casualties, death by freezing, drowning, suffocation and burning, explosions in mines, falling from heights, fatal traffic accidents and acute poisoning there never was any doubt as to the classification, although the attitude of the churches sometimes led to falsification of the records on suicides. Different however is the matter concerning death by ptomaine poisoning, by industrial intoxications, deaths due to intemperance, to birth injury or anesthesia, death of newborns due to negligence, or tetanus etc. Partly these cases appeared in the group of unnatural deaths, and partly they have been scattered throughout the list of natural deaths. (See Greenwood et al (7).)

In the 19th century more attention was paid to sui- and homicide than to industrial and traffic accidents and to all other unnatural deaths. Self-destruction and murder have been looked upon as a measure of moral and ethical standards, of social disintegration and also of mental pathology. (Von Oettingen, Quetelet, Durkheim, Legoyt, Adolf Wagner, J. Bertillon, Bonomi, Lombroso, Wappaeus, Despine, Masaryk, Morselli (8-11).)

In spite of the great alterations in the cultural level and economic structure during the last 120 or 130 years, the age curves for suicide and homicides remained basically unchanged. The age curve for

suicide is at considerable variance with the age curve of attempted suicide (Peller 12).

The more recent endeavors to find generalizations by studying the other unnatural deaths led to the hypothesis that a part of them is not the accidental result of neglect, omission or commission and not the consequence of purely external causes acting on the basis of chance, but are a composite of external dangers and internal forces. It seems that the victims of accidents are not a random sample out of persons exposed to similar hazards but a peculiar selection of "accident prone" individuals (Dunbar 13).

In the genealogical tables of ruling families the causes of death are not stated, except for those who became victims of enemy action. Of men over 15 years of age, born 1480-1879, almost five per cent of all deceased, namely 130, were killed in battle.[11]

In the 16th to 18th centuries, the percentage of those killed was high, with the peak in the 17th century. In the latter the whole increase of battle fatalities was borne by bachelors (whose losses were doubled), while the number of married men killed did not increase at all. In the 19th century the percentage of fatal battle casualties dropped to 2.6% of all men who died at an age over 15 years.

Persons killed in battle, as a rule, were young. Half of all of them were in their twenties; one quarter was taken from men of 15 to 19 and 30 to 34 years, while the fourth quarter was contributed by all the combined age groups above 35. (Table 16.)

Of all men of the ruling families who throughout the centuries have died at the age of 25-29 years, 17.6% succumbed to violence in war. Next came the age of 20-24 years, with 16.1% killed.[12] These percentages are very high indeed, for they do not regard war years but a continuous period of more than four centuries. The corresponding percentage for the age of 30-39 years was 10.4% [13] and for the youngest age groups, for the 15-19 year-old boys, 6.7%. Beyond the age of 40 the percentage of those killed diminished rapidly; for those 40-49 years old, it was 4.6%, while for men over 50 years, the value dropped to 0.3%.[14]

The steeply falling age curve of fatal war casualties can be ex-

[11] Including victims of revolutions.
[12] 35 out of 217 men.
[13] 35 out of 327 men.
[14] 4 out of 1387 men.

plained either by a radically lessened exposure of men beyond the age of 30 to the dangers of the battlefield, or by a greater caution characteristic of more mature men or by a combination of both. That it is not the first factor alone we learn from a study based on data from the Austrian army in World War I.

The age group of 18-23 had more fatal losses than 24 to 29-year-old ones and this in spite of the fact that the latter had been exposed in battle for a longer time and during the first part of the war when losses ran higher.

TABLE 16

RULING FAMILIES; MEN BORN 1480–1879. MARITAL STATUS AND AGE SPECIFIC RATIOS OF KILLED

Age at death in years	Bachelors			Ever Married			Percentage killed among men who died
	All dead	Of them killed		All dead	Of them killed		
		number	%		number	%	
15–	129	9	7.0	6	—	—	6.7
20–	190	33	17.4	27	2	7.4	16.1
25–	123	25	20.3	53	6	11.3	17.6
30–	95	16	16.8	76	7	9.2	13.4
35–	64	7	10.9	92	5	5.4	7.7
40–49	80	5	6.2	263	11	4.2	4.6
50+..	289	—	—	1,098	4	0.4	0.3
All[1]	970	95	9.8	1,615	35	2.2	5.0

[1] Of known age.

The age of 18-23 is the age of impulsive actions carried out with little reflection, of the greatest incidence of murderers and of attempted suicides, of the greatest losses on the battlefield; it is probably also the age of the greatest number of distinctions for bravery, of the most radical attitude, in short, of the greatest readiness to risk one's own life—out of enthusiasm or quick disappointment. (12)

Besides the age, it was the marital status that had a strong bearing on the probability of being killed, either by *a priori* modifying opportunity of exposure or by influencing the degree of courage or the dare-devil attitude during exposure. Whereas of bachelors who died between 1500 and 1936 as many as 9.8% or roughly one-tenth was killed, for the married men the corresponding figure was but 2.2%

(see Table 16). These are crude ratios. Within comparable age groups, between bachelors and married men the difference in the ratios of killed was smaller; instead of 4.5 :1 the standardized proportion was approximately 2 : 1.

In bachelors and married men as well, the ratios of those killed in war had their peak at the age of 25-29 years. Of those who died in this age, each fifth bachelor and each ninth married man was a war casualty. In age groups above 29, the percentage of those killed declined; in bachelors even more rapidly than in married men.

TABLE 17

PER 1,000 PERSON-YEARS OF EACH SUB-GROUP WERE KILLED

Age at death in years	Men of Ruling Families; born 1480/1879			U. S. A.; Men killed in 1910 by all kinds of violence
	Bachelors	Ever Married	A + B	
	Killed in battle*			
	A	B	C	D
15–	0.7	—	0.7	1.0
20–	3.2	0.9	*2.8*	1.7
25–	*3.7*	*1.1*	2.6	1.8
30–	3.5	1.0	2.1	1.8
35–	2.2	0.8	1.3	2.0
40–	2.2	0.9	1.2	2.0
45–	1.6	0.8	1.0	2.2
50+..	—	0.4	0.3	2.2

* And in uprisings.

Relating now the number of killed to the persons *alive* in the respective age groups, we find that bachelors in their twenties had comparatively 3.5 times more killed than married men had, while in the thirties the proportion was 3 : 1, and in the forties the relation was still 2 : 1 (See Table 17). From this one may infer that age brings a certain restraint, in its principle similar to the influence of marriage upon exposure to dangers in the battlefield.

We realize the tremendous losses of life suffered by the ruling families from their eternal feuds and wars when the rates of those killed in battle (Col. C) are compared with the death toll paid by American men to the total group of violence and accident (See Col.

D).[15] In the age groups 20-34 years, the death rates due to war casualties throughout the period of more than 400 years were much higher than were in 1910 the rates of American men from all unnatural (violent) deaths combined.

In Col. C of Table 17 for all men, bachelors and married put together, the death rate is at its peak at the age of 20-24 years. In the age group 25-29 the rate is lower, although for each of the two components studied separately, for bachelors and married as well, the rates of those killed were lower at 20-24 years than in the age of 25-29 years. There is no inconsistency in this statement. The apparent contradiction is explained by the effect the changing composition of the age groups according to the marital status has upon the percentage of those killed.[16]

We have to leave the question unanswered whether or not the characteristics ascribed above to the age of 18-23 in the 16th to 18th centuries made their effect felt a few years later. According to a former chapter physical maturation of women on the average was slower than nowadays. Probably this applied also to young men, and perhaps also the mental and psychological growth of both sexes was slower. The other possibility is that members of ruling families had a much stronger rational motivation for exposure to danger than the average man in a modern war and that therefore the age of most fatalities was less determined by impulsive emotions than it is at present.

Discussion

During the four centuries covered by our study death rates for middle and high age groups were constantly improving. This came as a surprise in view of the modest progress of these age groups during the second half of the 19th and the beginning of our own century.

Therapeutic medicine of former centuries hardly was in a position

[15] The year 1910 was chosen at random.

[16] The percentage of married men at the age of 20 was 6.1%, at the age of 25 years 27.3% and at the age of 30 years it rose to 48.8% and beyond the age of 30 married men were in the majority. The lower the age group, the more is the rate of those killed determined by the percentage of bachelors; the higher the age group the more does the rate of war losses among the married men impress itself upon the rate of killed for the whole age group.

to fight successfully the diseases which terminate life in the age above 50 and especially above 70. Therefore we have to look into other fields for an explanation.

Three factors have to be considered. First, persons over 50 years of age gradually learned and were enabled to meet the physiological demands of their age as to housing, nutrition, clothing, rest and recreation. By this they were slowly improving their state of health and their resistance to intercurrent diseases of the respiratory and digestive organs, thus reducing the incidence of these ailments per 100 person-years. Second, there was progress in the attitude towards, and in the care for, the acutely ill. The third factor is a gradual increase throughout the centuries of the age at which certain degenerative diseases, first of all cancer, used to become manifest and to terminate life.

For this hypothesis the evidence is indirect. There do not exist complete lists of causes of deaths for a continuous period of 200 or 300 years. Moreover, former attempts to unriddle the terminology in the existing old records for the age groups above 50 always have failed. An example may be shown in the following Table which comprises all deaths [17] that occurred in Vienna in 1752 and 1753 (Peller 14).

Of 2,513 persons who died at the age of 50 and over, not less than 45% were recorded to have died either of inner or cold or pulmonary "Brand" (gangrene). Unable to detect the clinical and pathological equivalent of such terms, the research worker, whether he tried it one hundred (Wunderlich (15)) or 40 years ago (Gottstein (16)) had to restrict his curiosity to the acute infectious diseases and tuberculosis. At present, however, we are in a more favorable position, since for the first time in history we know, at least approximately, the distribution of fatal diseases among those who died in their fifties and later. The knowledge of the changes in the death records of the last half century gives us a key to the understanding of more remote times.

Around 1900, of persons who died above the age of 45, many were listed under terms like old age, senility, marasmus, or without given cause of death, and relatively few were reported as victims of cardio-

[17] Except for infants.

TABLE 18

VIENNA, 1752–1753. NUMBER OF DEATHS IN ALL AGE GROUPS EXCEPT THE FIRST YEAR OF LIFE

Age at death in years	Smallpox	Convulsions[1]	Steckkatarrh (Pertussis)	Fevers[2]	Apothema cerebral and thoracal	Hectica, Lung defect and catarrh	Consumption
1–4	594	528	112	25	145	603	—
5–9	119	16	30	40	20	208	—
10–14	9	6	4	25	3	57	3
15–19	6	5	1	35	—	39	7
20–29	2	19	1	164	6	70	64
30–39	1	8	—	127	5	83	64
40–49	—	4	3	72	3	69	102
50–59	—	1	9[3]	61	5	104	112
60+..	—	—	16[3]	17	—	168	113
All[4]	731[5]	587	176	566	187	1,401	473

Age at death in years	Pneumonia	Emphysema	"Brand" (gangrene) pulmon	"Brand" (gangrene) inner and cold	Apoplexy	Hydrops	Varia[6]	Sum-total
1–4	—	—	25	73	—	78	45	2,231
5–9	3	—	14	84	—	60	13	597
10–14	3	—	14	40	—	32	16	212
15–19	9	1	2	28	3	19	9	164
20–29	21	5	27	89	2	40	29	559
30–39	20	6	48	117	23	39	34	575
40–49	20	14	78	148	42	64	34	653
50–59	19	19	119	249	111	109	64	982
60+..	20	39	180	585	96	128	169	1,531
All[4]	115	84	507	1,413	277	569	423	7,504

[1] Including eclampsia.

[2] Of them 160 Friesel, that is scarlet fever and measles and 406 due to typhoid or typhus.

[3] Most probably asthmatic conditions.

[4] Except first year of life.

[5] In first year 285 deaths, making a total of 1,016.

[6] Content, see text, page 95.

vascular-renal diseases, diabetes and cancer. The rest was signed out under tuberculosis, pneumonia, some other intercurrent disease, accident, etc. This was so in the centers of medical learning and education. Since then the number of deceased under such unrevealing terms as old age has been shrinking; simultaneously as well as proportionally the percentage of those increased who were reported as victims of cardio-vascular-renal diseases, cancer and diabetes (17). A few examples.

In New York City, in 1896/1900, 1906/10, 1916/20, 1926/30 and 1931/35 there died annually of " senility ": 965, 698, 288, 172, and 95 persons, respectively. The number of these dead diminished strongly, although during these four decades the number of old persons was growing constantly.

In London, in 1880, there died 13,045 persons 65 and more years old. Of them 4,476 or 34.4% died of old age, and 583 or 4.5% succumbed to cancer. Half a century later, in 1929, the corresponding values were 27,681 persons, 1594 or 5.8% termed old age, and 3145 or 11.4% listed as cancer.

In Vienna at the age of 70 and more years, in 1901 there died altogether 4,044 individuals, of them 1278 or 31.9% due to old age, 683 or 17% due to circulatory disturbances, and 378 or 9.0% died of cancer. Thirty years later, in 1931, the corresponding figures were 7,217 dead at the age of seventy and more years, of them 673 or 9.3% ascribed to old age, 2,346 or 32.5% to diseases of circulatory organs and 1,039 or 14% to cancer. While in 1901 all the three headings encompassed 58.3% of all deceased at the age of 70 and more years, in 1931 it was 56.2%, practically the same value.

Nothing but an exchange of terms had occurred, the more recently used pointing at real pathology while the discarded ones had been screening ignorance.

In the general population, during the last half century, the slow process of substituting proper diagnoses for inadequate terms has been a less dramatic replica of what happened in 1879 in the cobalt mines of Schneeberg, Saxony, and in 1929 in the radium mines of Joachimsthal, Bohemia. In Schneeberg, for centuries miners used to die of " Bergkrankheit " (e. g. Bergmann's disease or miners' disease). In the 19th century this term was eliminated in favor of

"dust disease" and "tuberculosis," until in 1879 Härting and Hesse (18) found the disease to be a malignant growth of the respiratory organs.[18] The term changed twice but the disease remained the same.

In Joachimsthal, only a short distance from Schneeberg, the miners used to die of "tuberculosis" until 1929, when Loewy (20) and Pirchan and Sikl (21) demonstrated that pulmonary cancer was mistaken by the physicians for pulmonary tuberculosis. Although the miners had twenty-four times as many lung cancers as any other comparable male population (Peller (22)) the cancerous nature of the disease had escaped recognition. The fact that a disease which felled more than half of a medically supervised group of men over 40, could still in the 1920's hide under the name of another, well defined and known disease makes understandable less obvious but equally tenacious diagnostic mistakes in the general population.

In the latter, however, the process of correcting customary mistakes has not been the outcome of any special investigation. Progress was slow and resulted from gradually improving facilities (x-rays), increasing frequency of hospitalized persons as well as of surgical interventions and post mortems. Only seldom was this connection correctly perceived. Therefore most authors believed in a puzzling spread of the degenerative diseases, especially of cancer which, in the last decades, more than any other disease of middle and old age caught the imagination of the public. The belief of a growing cancer menace was strengthened by improper statistical methods.[19]

Most probably, what two centuries ago (in Vienna) was listed as inner or cold or pulmonary "Brand" (gangrene), half a century ago in death records was labeled old age or senility, while today we subordinate these cases to a definite pathological entity that belongs to the complex of degenerative diseases. The former enigmatic terms covered most of that complex.

In the middle of the 18th century, the total annual mortality of persons over 50 years was very high as compared with present-day

[18] They thought it to be a sarcoma originating in the hilus, while later, in 1912, Arnstein (19) corrected the histological interpretation into a bronchogenic carcinoma.

[19] Absolute numbers and crude rates instead of age specific rates and standardized rates.

standards; in Vienna it was 50.3 per 1000. Of one hundred dead in these age groups, 19.4% were accounted for by hectic fever, pulmonary defect, pulmonary catarrh and consumption (Lungensucht and Schwindsucht), in short by tuberculosis. This is a high portion of a high mortality. (Table 19.) Nowadays, in the major cities of the U. S. A. of all persons who die at the age of 45 and more years, only 2.6% (for whites 2.4% and for Colored 5.1%) succumb to tuberculosis.

TABLE 19

TUBERCULOSIS MORTALITY PER 1,000

Age	1752–1754	1910–1911
1*– 4	23.3	4.4
5 – 9	7.5	1.6
10–14	2.5	1.0
15–19	1.35	2.3
20–39	2.1	3.3
40–49	3.9	4.0
50+	9.8	4.0

* Infancy is not included.

As to the others deceased in the age of 50 and more years, 4.6% died of acute infectious diseases and pneumonia, 9.4% of hydrops, 8.2% of apoplexy, 2.3% of emphysema and 9.3% died under one of various conditions put together in the table under the heading "varia." Among them is ileus, incarcerated hernia, hematemesis, colics, inner rottenness, marasmus, accidents and a few cases of breast cancer.[20] Inner, cold and pulmonary "Brand" together with hydrops, apoplexy and emphysema accounted for two-thirds of the deaths in the age above 50. In the author's interpretation this is the complex of degenerative diseases.

Within the 2 years, 1752/53, according to the official records, only a few women died of breast cancer and there were two cases of cancer of the thigh.[21] This does not prove that 200 years ago breast cancer or cancer in general were rare. Had breast cancer been rare,

[20] In younger age groups: hemorrhagic diathesis, scurvy, scarlet fever (a few cases), 2 sarcomas, etc.

[21] The latter in younger years.

Ramazzini in 1713 (23) could not have established the differences in the incidence of this type of malignancy between nuns and married women, nor would I. Louis Petit and Benjamin Bell had developed the two still valid basic principles of breast cancer surgery,[22] nor would there have been enough observations to stimulate investigations on heredity of cancer at the end of the 18th century. Four-fifths to seven-eights of the breast cancer victims whom one would expect according to present standards in a city of about 175,000 inhabitants were lacking because of the then rudimental knowledge of the relationships between primary tumors, metastases and death.

At present, persons over 50 have a total annual mortality of about 35 per 1000 and a cancer mortality of around six per 1000, cancer occupying one-sixth of all and about one-third to one-fourth of the deaths due to degenerative diseases. If 200 years ago not more than ⅛ of all who died at the age of over 49 years, and only ⅕ to ⅙ of those who died of degenerative diseases was accounted for by cancer, this disease was then in corresponding age groups at least as frequent as today. In this case, among persons of 50 and more years cardiovascular-renal diseases were much more frequent than they are at present.[23]

Total and age specific cancer death rates as well as distribution of cancer according to the primarily affected site are variable. This variability is a function of certain environmental factors like contacts with carcinogens during work, standards of living, social conditions, climate, reproductive activity, alcohol, habits, etc. Intensity and volume of these factors had changed considerably; and probably also the still unknown carcino-relevant factors underwent changes. Two hundred years ago city dwellers used to live in darker rooms and narrower streets; they did not appreciate outdoor life, sun-exposure and sports. This made them less liable to develop skin cancer, but promoted manifestation of internal tumors. Moreover, as cancer mortality in younger and middle age groups is inversely

[22] First removal of axillary glands, of the pectoral fascia and muscles; second early treatment.

[23] Within this complex there may have been substantial changes, as they even have occurred in our time. Nowadays, benign hypertension and coronary disease are more frequent than generalized sclerosis of the intima of big and small vessels, while half a century ago the opposite was true.

associated with the standard of living,[24] and the average standard 200 years ago was much lower than at present, it is probable that internal cancer appeared earlier than now.

In the 18th century when scrotum cancer of chimney-sweeps was described by Percival Pott (24) it was a deadly disease of the puberty age. In the 19th century on account of the British child labor legislation the age of appearance of this epithelioma rose to 30 and 40 years, later, due to improved cleanliness and stricter precautions, it rose further, and today it is a disease of middle and high age. Child labor became restricted also in other cancer relevant occupations and the effect most probably was the same, although it cannot be followed as precisely as for the "climbing boys." There are also some other facts known which point in the same direction, that is toward a rising age of cancer appearance. Women whose pregnancies follow one another in short intervals have their cancer of the genitals and breast manifest a few years earlier than when the intervals are longer. Since in former centuries the fertility was generally much higher than at present, it is justified to assume that in the 18th century female cancer appeared earlier. The same conclusion most probably applies to the other degenerative diseases, foremost to those of cardio-vascular-renal origin. It was due to the early development of the degenerative diseases that men and women aged more prematurely and were losing more rapidly in vigor and resistance than nowadays.

While epidemiology of cancer provides us with a number of facts indicating an earlier manifestation of this disease in past centuries,[25] I do not know of any facts which would point in the opposite direction.

In the 19th century, younger age groups and people of the lower strata benefited from the growing humanitarian approach to and understanding for the needs of the sick as well as from the precautionary sanitary activities which reduced the menace of acute infectious diseases. Many a person who formerly would have perished in younger or middle years of life now survived them and reached old age. By this and by the increasing percentages of the

[24] As shown in English occupational mortality statistics by comparison of social classes and in the U. S. A. by comparison of white and colored.

[25] Of course, on account of the different age distribution of the population, the number of cancer cases per 1,000 of the population was then much smaller than at present.

industrial population in congested city areas the average standard of vigor and health of middle and old age persons was weighed down, interrupting for some time the decline of their mortality level.

Mortality of the aged partly reflects the conditions in that very age and partly is a function of conditions of work and health in preceding periods of life. Both deterioration and substantial general improvement of conditions during middle age may have the same influence upon total mortality of the aged, but have diametrically different effects upon the numerical relation between the aged and the preceding lower age groups. In the study of health problems in middle and younger age groups we may limit ourselves to checking the trend of death rates (or of morbidity rates, if available), while in studying historical developments within old age attention has to be paid to both (a) the mortality of the aged and (b) the numerical relation between the cohort of the aged and the cohorts of the younger age groups.

Summary and Conclusions

(1) The study presents trends of mortality since 1500 for the most privileged group of persons. The values can be considered as optimal for the previous centuries.

(2) The data given by Ulpianus for ancient Rome in conjunction with our data indicate that after 1.5 millennia mortality was at about the same level, while since the Renaissance mortality and life-expectancy—including old age—have been considerably improving. In the last decades the improvement became accelerated. The mortality rates of the members of the ruling families born 1780-1879 were less favorable than are present rates for the general population of the United States. And yet the latter are far from optimal. Differences in mortality rates between whites and Negroes in 1940 are at least as big as were the differences within the ruling families between the first and the fourth century of our study. Both groups of differences are due to different standards of living.

(3) The basic changes in mortality since the Renaissance may be exemplified in the following sets of data of which the first

and second refer to the men of ruling families born 1480-1579 and 1780-1879, respectively, and the third figure in each set refers to the Life Tables 1940 of white American men:

(a) Of the newborn were dead before the 15th year of life: 30, 17 and 6%.

(b) Of male newborns every second was dead before the age of: 25, 55, and 68 years.

(c) Of boys 15 years of age there died before the age of 50 years: 56, 27 and 13.5%.

(d) Of men at 50, there died before the age of 70 years: 82.5, 56 and 42%.

(e) In men at 70-74, there occurred per 100 person-years: 17, 9, and 6 deaths.

(f) Of men at 70, there became octogenarians: 5, 32, and 44%.

(4) Women's mortality has always been more favorable than that of men. In the last two centuries the difference between the two sexes diminished in the age of 15-49, and increased in the age above 50 years. The differences between the two sexes can be shown in a similar way as sub point (2).

(a) The total future life span of 15-year-old boys was: 31.5, 44 and 52 years, and that of girls: 36, 46 and 57 years.

(b) Of 15-year-old boys were alive at 75 years: 3.1, 21 and 36%, and of girls: 8.7, 30 and 47%.

(c) The future life span of 70-year-old men was: 4.7, 7.0, and 9.4 years, and that of women was: 6.8, 8.8, and 10.5 years.

(5) Mortality of married men always has been more favorable—especially in the age below 50—than that of bachelors, and the latter had more favorable death rates than childless married men.

(6) Throughout the four centuries of our study, among bachelors each tenth death was due to warfare; the corresponding value for married men was 2.2%. A part of this difference is due to the age-factor. The highest losses on the battlefield

were suffered by 20 to 24-year-old men. The fatal war casualties are not merely a function of duration of exposure but have always been influenced by age specific psychological constellations.

(7) While in the second part of the 19th and in the first decades of the 20th century mortality rates of young persons of the general population were constantly improving, the death rates of the aged exhibited but little tendency to improve. This was a transitory phenomenon. Successful combat of acute infectious diseases and improvement in the care for the sick below fifty without adequate improvement of their housing, living and working conditions had retarded the decline of the mortality of the aged. However, mortality of the highest age groups was subject to substantial reduction in the past and is capable of further reduction.

(8) Two-hundred years ago in the majority of persons who died at the age over 50 the cause of death was given in terms which failed to be comprehended until the real distribution of the causes of death became known for at least a few places. As long as the real frequency of cardio-vascular diseases and of cancer was greatly underestimated and as long as the improvements in recording of the terminal diseases were mistaken for growing frequency of degenerative diseases, the unriddling of the records of the 18th and the early 19th century was impossible. In essence and quantity, the mysterious terms in the lists of causes of death of two centuries ago correspond with "old age" and "senility" of the mortality records one generation ago, and with the degenerative diseases at present.

(9) Using recent history as a key to the past, it is assumed that in former centuries degenerative diseases, and especially cancer in corresponding age groups were at least as frequent as at present and for reasons discussed in this paper most probably developed at an earlier age than now.

(10) Today losses run low in infancy and childhood and high in old age. In order to achieve further progress, in advanced countries science and public health authorities should shift their attention to the age groups beyond adolescence.

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A MERRY MEDICINE FOR THE TEETH
(ca. 1520)

CURT PROSKAUER

In a paper entitled "*Pestregiment* and *Artzeney zu den bösen Zähnen* of the Year 1531. A Contribution to the Earliest Dental Literature" I sought to prove that a dental bibliography should include not only books dealing *exclusively* with dental science but all books whose title-pages make any sort of reference to the subject: "Inclusion of a book in a dental bibliography need not be made dependent on *exclusively* dental contents. The mere fact that *reference to a dental section* is made *on the title-page*, suffices to have the item included regardless of whether it is in first place or tagged on as a more or less important appendix."[1]

If the contentions put forward in the aforementioned article are accepted, then a dental bibliography must assign a place—and *chronologically the first place*—to a little booklet that has till now remained unknown to medico-historical literature. Its title reads:

℣ *Sēsuyt le de / bat de lhōme et / de la femme. Compose par maistre / Guillaume alexis. Auec une ioyeuse / medecīe pour les dentz. Jmprime nou / uellement a Paris./*

(Here Follows the Dispute of the Man and the Woman. Written by Master Guillaume Alexis. With a Merry Medicine for the Teeth. Printed anew in Paris.)

Around 1490 *Le débat de l'homme et de la femme*, written in verse form, appeared for the first time in Lyon—*without* the *Merry Medicine for the Teeth*, which was added later. The author, Guillaume Alexis, was a French monk of the Abbey of Lire who wrote a series of religious, moralistic and satiric poems castigating the social evils and depravities of his time, i. e. the second half of the fifteenth century. In the course of the next thirty or forty years several editions

[1] *Bull. Hist. Med.*, 1943, 13: 86.

of "The Dispute" appeared. The last edition so far discovered came out around 1520—some students make it about 1530—[2] in Paris, and to this late edition were appended two satiric poems. The first of these, *Une joyeuse médecine pour les dents*, is expressly mentioned on the title page, whereas the second, *Un Ave Maria joyeux sur le temps de maintenant*, is not mentioned.

Neither of these appended satiric poems—here we are interested only in the first—was written by Guillaume Alexis and neither of them, oddly enough, has any connection with his poem. It is thus useless to inquire further into the contents of "The Dispute" or the facts of Alexis' life.[3] The author of the two appended poems remains unknown.

The little book—9 cm. wide, 13 cm. high—is in Gothic letters, single column, and lacks the imprint of the printer and year of publication. It consists of eight pages, signed A^8, twenty-six lines each. Beneath the text of the title we find a woodcut depicting a monk—possibly the author himself—seated at a reading desk.[4] On the reverse side of the page, as well as on the last printed page, another woodcut makes allusion to the contents of the book: A man with his left hand on the pommel of his sword is speaking to an apparently overwrought woman who stands facing him, bolstering her arguments with upraised hands.[5] The "Merry Medicine for the Teeth," which comprises thirty-five verses, starts on page A_6^v and ends on page A_7^v.

[2] Tchemerzine, Avenir: *Bibliographie d'éditions originales et rares d'auteurs Français des XV^e, XVI^e, XVII^e, et XVIII^e siècles.* Vol. I. Paris 1927. p. 78 (b) gives the year of printing as "ca. 1530," whereas the *British Museum General Catalogue of Printed Books* Vol. III. London, 1932 gives "1520?."

[3] Further particulars about Alexis and his works in: *Oeuvres poétiques de Guillaume Alexis, prieur de Bucy, publiées par Arthur Piaget et Emile Picot.* Paris 1896-1908.

[4] The same woodcut, printed from the same woodcut-block was also used on the title-page of the anonymous booklet *L'Art et science de Arismetique . . . Imprime a Paris, pour Jehan Bonfons, . . .* n. d. (ca. 1550). (Reproduced in Catalogue 224 No. 77 Gilhofer & Ranschburg, Vienna).

[5] This woodcut is to be found also in:
Alain Chartier, *Les demãdes / Damours Auec / Les Responses.* / (vers 1530?) Lyon. (Tchemerzine III. 308. 309a) and in Alain Chartier, ¶ *La belle Da- / me sans mercy.* (Tchemerzine III. 314.)

We know of only two complete copies of this edition.[6] One is in the British Museum in London and the other is the property of Mr. Imry De Vegh, New York, who was so kind as to place at my disposal photographs of his copy and so earn my heartfelt thanks.

In addition to a reproduction of the title-page, the woodcut of the disputing man and woman and the text of the dental poem, we offer here its English translation and also a translation into modern French, since many words in the old French are difficult to understand.[7]

¶ S'ensuit une médecine pour les dents.

Or écoutez mes bonnes gens,
Et je vous dirai pour les dents
Une grande médecine.
Vous ne pourrez, si je ne mens,
Trouver de bons enseignements
Pour connaître une urine:
Prenez d'un fourmi le couillon,
Le cinquième pied d'un mouton,
D'une puce l'oreille,
Avec de l'huile de coton,
Le cri d'une corneille,
Puis me prenez d'un caillou bis
Le sang et le seing d'un vieux huis
Et le mettrez ensemble
Des tremper en un seul pertuis
Où le soleil rais de nuit,
Et gardez qu'on ne l'emble
J'ai lu en un livre ancien
Que guérir des dents fait grand bien

[6] A third copy, without the title-page, is listed in the Catalogue Lignerolles, IV, 1895, no. 851.

[7] For the translation from the old French I have used: Frédéric Godefroy, *Dictionnaire de l'ancienne langue Française*, Paris 1880-1895, and Edmond Huguet, *Dictionnaire de la langue Française du seizième siècle*, Paris 1925-1933.

I am under great obligation to Dr. Leo Spitzer, The Johns Hopkins University, Baltimore, for his kind assistance in the translation of many words unintelligible to me.

D'une jument (instead of tument) la couille
Prendre beaucoup où il n'y a rien
Avec la corne d'un chien
Si ci faites une andouille
Puis me prenez de tous les vents
Avec les quatres éléments
Mis en un pot de terre
De l'ombre d'un fosse de dents
Mettez, ce sont bons oignements
Pour fair un homme paint
Et me le faites tant bouillir
Que vous en voyez hors saillir
Une vieille qui vesse
Et si des dents voulez être guéries
En hiver avec elle allez gésir
Et mettez votre nez entre ses fesses.

℄ Here follows a medicine for the teeth.

Attend now, good people,
And I shall tell you of a fine remedy
For the teeth,
Else you shall not find, if I speak sooth,
Proper rules
Even for recognizing a drop of urine:
Take the testicles of an ant,
The fifth foot of a wether,
Take the ear from a flea
Along with the oil of cotton,
The croak of a crow,
Now put to that the blood of a grey pebble
And the fat of an old door,
And mix them all together
For soaking in a single hole,
Where the sun shines by night,
And take heed that no one steals it.
I have read in an old book
That for curing bad teeth there is much virtue

In the testicles of a mare,
Taking much where there is nothing,
With the horn of a dog.
If you will make a German sausage out of the foregoing,
And take all the winds
And also the four elements
Laid in an earthen pot,
And add the shadow of the socket of a tooth,
These are good ointments
Wherewith to paint a man.
Now let them boil so hard
That you will see arise
An old woman, who breaks wind,
And if you would have your teeth cured,
Lie down with her in the winter
And lay your nose between her buttocks.

These utterly senseless directions of the " Merry Medicine for the Teeth " couched in coarse Rabelaisian language quite obviously excoriate the evils of prescribing in those days. The recipes commonly listed countless ingredients, for the most part worthless but so impressive by virtue of their mysterious names and mysterious methods of preparation that the patients often benefited by them, psychically at least.

In order to impress the absurdity of such prescriptions upon even the simplest reader, the anonymous author of the poem exaggerates his recipe to the point of comicality, even grotesquerie, making them patently preposterous and self-contradictory. Thus he recommends ingredients that do not exist—the testicles of a mare, the fifth foot of a wether, the horn of a dog and so on—and gives self-contradictory instructions for their preparation—where the sun shines by night, take much where there is nothing—so combining nonsense with paradox. Such passages remind us of the nursery rhymes so popular in Central Europe:

It was noon, the moon shone brightly,
When the wagon quick as lightning
Slowly came around the corner. . . .

C Sēluyt le debat de lhōme et

de la femme. Compose par maistre Guillaume alepie. Auec vne ioyeuse medecie pour les dentz. Imprime nouuellement a Paris.

I

Plus hommes taupez a lamande
Plus de femmes vont a loffrende
Il est plus dhommes en prisone
Et plus de femmes aux sermons
De tous hommes pouures & riches
Ont este meres et nourrisses
Femmes ont eu auctorite
Sus tous hommes qui ont este
Qui sont et qui iamais seront
Et tous femmes gouuerneront
Pourquoy en doit on dire bien
A mesdire on ne gaigne rien
A tencer nō a contrebatre
Qui na la grace de bien dire
Ou la grace de soy bien taire
Et qui ne peult ou veult bien faire
De mal faire se tienne en paix
Mon bastille amenuller les mauluais

Explicit.

C Sensuyt vne medecine pour les dentz

Escoutez mes bonnes gens
Et ie vous diray pour les dens
Vne grande medecine
Dont ne pourrez faire vng

Trouuer de bons enseignemens
Pour congnoistre vne ozine
Prenez dung fourmy le cueillon
Le cinquiesme pieds dung mouton
Dune puce loreille
Auec de thuylle de coton
Le cry dune corneille
Puis me prenez dung caillau bis
Le sang & le sein dung veaulx sorys
Et le mettrez ensemble
Destremper en vng seul pertuys
Ou le soleil raye de nuict
Et gardez quon ne tremble
Jay leu en vng viure ancien
Que guarit des dens fait grant bien
De vne iument la cueille
Prendre beaucoup en il nya rien
Auecques la corne dung chien
Si en faictes vne ambouille
Puis me prenez de tous les dentz
Auecques les quatre esmens
Mis en vng pot de terre
De lombre dung fosse de dentz
Mettez se sont bons oygnemens
Pour faire vng homme peint
Et me le faictes tant boullir

II

Une dame en voyez saillir
Une vieille qui vesse
Et si des deux voulez estre garny
En vuet amer elle allez gesir
Et mettez vostre nez entre ses fesses
¶ Explicit.

¶ Cy ayt vng aue maria lequel
fut le temps de maintenant.

Ave maria nostre dame
Mais comment vivent pouure gent
Car gratia ne faict a ame
Si prins na nest bourse dargent
Qui a de largent largement
Et en despend a grant foyson
A chascun luy dist entierement
Moy amy dautruy temps.

¶ Benedicta est la personne
Pourueu quil ait assez monnoye
Et que largement il en donne
En chascun lieu on luy faict voye
Homme qui na dequoy il paye
Du qui ne monstre de quelque
Il nest pas digne quon le voye
Dollez ly mulieribus

¶ Benedictus qui a argent
Et que largement il en boute
Car il faict parler mainte gent
Et ouyr cruly qui noyent goutte
Qui na argent on le deboute
Ne la nature honneur ne puis
Ne en compaignie on il se boute
Ne trouuera fructus ventris.

¶ Tel peult bien considerer
Quargent faict miracle sans faille
Car il faict ouyr & parler
Et faict auoir bien & vitaille
Homme qui na denier ne maille
Dequoy sera son testament
Il luy mescheet qui sen trauaille
Du pouoir de Jesus-Amen.

¶ Finis.

III

IV

Such nursery rhymes delight the innocent childish mind with their obvious nonsensicality.

It is clear that the prescriptions of the " Merry Medicine for the Teeth " contain nothing in the slightest degree useful for the care of the teeth or the relief of pain, so that the poem can nowise have enriched the materia medica of dental science or influenced its development. We find its significance for dentistry and medicine in general in the fact that possibly this poem, along with other literature serving the same object—in verse or prose—acted to promote a recognition of the worthlessness and danger of the medical recipes so popular at this time. Although it is certain enough that the contents of the poem do not warrant its being classed with the first printed dental monograph, *Zene Artzney* (Leipzig 1530), or even compared with it, the little book with the nonsense verses must properly be set *before the monograph* chronologically speaking.

TWO EARLY LETTERS BY ELIZABETH BLACKWELL

FREDERICK C. WAITE

The commonly accepted tradition is that Dr. Elizabeth Blackwell applied to several, even many, medical colleges before she found one that would accept her as a student. The two letters that follow, discovered a hundred years after she had written them, appear to indicate that she made formal application to only two medical colleges and both accepted her application. The letter that follows is postmarked at Philadelphia on October 15 and the text is as follows:

Philadelphia, Oct. 8th 1847.

Dr. Perkins,

Sir,

Will you allow me to make an application through you, to the Faculty of the Castleton Medical College for permission to attend the lectures of the Institution.

I wish to obtain a regular medical education and have been advised by Professor J. K. Mitchell, Dr. Warrington, and other friends in this city to seek for admission into the Castleton School as being an admirable institution, and from its location and the character of its students, not open to those objections which prevent my entrance into similar institutions in Philadelphia.

Some years since, I resolved to devote my life to the Profession of Medicine, believing that the practice of certain departments would devolve with peculiar propriety upon a woman. I realized however, the weighty responsibilities that rest upon a physician and the absolute necessity for thorough acquaintance with the various departments of medicine, and determined to obtain a complete education and a Degree, as the testimonial of my attainments. I read medicine under the direction of Professor S. H. Dickson of Charleston, and have received from him a satisfactory certificate of preparatory study. By his advice I came to Philadelphia as the city where I could best obtain the instruction I needed. I have had various conferences with the Professors of the different Medical Schools and have received encouragement and assistance from many of them. Dr. Jackson of the University, and Dr. Mitchell of the Jefferson, expressed great regret that the size and character of their classes would prevent my becoming a member of them, but declared their hearty approval of my endeavor, and both advised me to seek aid from your Institution.

I desire earnestly to obtain the education I need in America. I could obtain it in Paris, and I find that in Berlin, the daughter of Professor Sebold, had passed through the regular courses, obtained a Degree in Medicine, and

is practicing successfully in Berlin—but though my acquaintance with the french and german languages would render a foreign tongue only a slight obstacle, the expatriation would certainly be a severe trial. I shall not however, hesitate a moment if it be my only plan, but I cannot yet believe, that I shall have to seek in Europe, the assistance America denies me. You, Sir, have the power of rendering me the aid I need; will you not encourage my attempt, and open to me, in true New England spirit, the many advantages of your Institution.

Very respectfully

ELIZABETH BLACKWELL.

15 Marshall St., Philadelphia.

An endorsement on this letter, in the handwriting of Dr. Perkins, shows that it was received on October 20 and answered on November 15. This letter was addressed to Joseph Perkins, M. D., (1798-1872) who was the Professor of Materia Medica, Therapeutics, and Obstetrics in the Castleton Medical College which existed at Castleton, Vermont from 1818 to 1862. Dr. Perkins was also president of the faculty, a designation then used for the officer we now call a dean.

The second letter has the following text:

Dr. Perkins, Geneva, Nov. 24th 1847

Sir,

I have just received your letter forwarded to me from Philadelphia and I hasten to thank you, and the other Professors of the Castleton Medical College, for so liberal and encouraging a reply to my application.

At the same time that I wrote to Castleton I sent a letter also to the Geneva N. Y. Medical School. I received an immediate reply, consisting of a unanimous invitation from the Faculty and Class, to become a member of their Institution, which I at once accepted. I have been now, for some time, a student in the Geneva School, and have experienced a liberal kindness from the Professors, and a respectful consideration on the part of the class, that is truly gratifying. I am unable then to embrace the opportunities which your generosity has opened to me, but I would request you to present to the Faculty of the Castleton Medical College, my expression of gratitude for the favorable response which my application has received.

Very respectfully,

E. BLACKWELL.*

* These two letters were loaned to the author by the great-granddaughter of Dr. Joseph Perkins and are published with her permission. The original letters have since been deposited in the Johns Hopkins Institute of the History of Medicine.

The first letter contains several references of interest, namely that prominent medical teachers in Philadelphia encouraged Miss Blackwell in her revolutionary attempt to graduate in medicine, that she was considering study in Europe, and that she had enough command of French and German so that instruction in either language appeared to her as only a " slight obstacle."

The reference in the second letter to the immediate reply from the Geneva Medical College appears as a mild criticism of the delay in reply from Castleton. Castleton Medical college in that period gave two sessions in each year, one in the autumn and another in the spring. The autumn session was about half completed when the application was received and its acceptance contemplated entrance at the beginning of the spring session on February 24, 1848. Geneva Medical College gave only one session in each year which began in early November. This difference in dates of sessions of the two institutions is the probable reason why the first woman to graduate in medicine in the United States did not receive her degree from the first medical college established in Vermont.

NOTES AND COMMENTS

THE LATIN POET MAXIMIANUS ON THE MISERIES OF OLD AGE

MAX NEUBURGER

The general physical and psychical changes common in later life were long ago described by intelligent laymen. These changes were often vividly pictured and with considerable accuracy. Especially influential has been the view of old age as pictured in Ecclesiastes. "The best-trained clinician" says Lewellys F. Barker, "might well envy this Preacher in Ecclesiastes for his ability so wonderfully and figuratively to characterize some of the outstanding features of old age—the tremor of the hands, the tendency to stoop, the loss of teeth, the inclination to early rising, the failing eyesight, the developing deafness, the growing apprehensiveness regarding environmental dangers, the graying of the hair, the increasingly felt burden of slight irritations, and inconveniences, and the waning of sexual desire and potency."

Among the Latin poems which have come down to us the elegies of Maximianus deserve prominent mention for the author's complaints of the miseries of old age.

Maximianus, a Latin poet of Etruscan birth, flourished during the sixth century A. D. He spent his youth at Rome, where he became known as an adept in all the fashionable amusements then in vogue. He swam the Tiber in winter, went bare-headed in any extremes of weather, needed little food or sleep, and could on occasions be a hard drinker. He was distinguished as a speaker and a poet. He was, moreover, handsome, and attracted the eyes of the Roman ladies as he passed through the streets.

Maximianus was in consequence sought as a son-in-law by many families of distinction, and for a time occupied the peculiar position of a sponsus generalis or universal suitor. Nature, however, had made him cold, and unable to find a consort that satisfied his fastidious requirements, he remained unmarried. If, however, he could not fix upon a wife, he has left on record the names of three women—

Lycoris, Aquilina, Candida—who successively occupied his affections. Some time after this, Maximianus was sent on an important mission to the East, perhaps by Theodoric. In Constantinople the artifices of a Greek woman, possibly the hostess in whose house he lodged, diverted his attention from diplomacy to love. His advancing years, however, soon brought a disastrous termination to this affair.

The Elegies of Maximianus were frequently reprinted under the name of Cornelius Gallus, the ill-fated friend of Virgil and Ovid. There is an English version (as from Cornelius Gallus) by Hovenden Walker (1685) under the title *The Important Lover*.

In the year 1501, Pomponius Gauricus, a Neapolitan youth of nineteen, published at Venice six amatory elegies under the title " Cornelii Galli Fragmenta," with a preface in which he endeavoured to prove that they must be regarded as belonging to Cornelius Gallus, a poet of the Augustan era. But on the basis of critical examination and with regard to the early printed impressions of which two at least, if not three, had appeared in the fifteenth century, actually furnishing the name of the real author, it became evident that fraud had been at work. In addition it was discovered that the name of Maximianus was prefixed to many manuscripts. Gauricus had been guilty of deliberate imposture.

The Editio Princeps is known by bibliographers to have been printed at Utrecht about 1473, and a second edition, also very old, was printed at Paris. The present division into six parts is purely arbitrary. In many codices the whole text is written as one continuous poem, with the following or some similar title, " Facetum et perjucundum poema de amoribus Maximiani, poetae doctissimi, oratoris suavissimi."

There are the following modern editions: J. C. Wernsdorf, ed., *Poetae latini minores*, VI; E. Baehrens, ed., *Poetae latini minores*, Leipzig, 1883, Vol. V; M. Petschenig, ed., *Maximiani elegiae* in: *Berliner Studien für classische Philologie und Archaeologie*, 1890, Vol. XI; Richard Webster, ed., *The Elegies of Maximianus*, Princeton, 1900.

The six Elegies profess to be written by an old man, and the leading theme is the infirmities and miseries of age. These, as contrasted with the vigour and joys of youth, form the exclusive subject

of the first part. The second, third and fourth contain an account of three mistresses who had in succession ruled his heart, Aquilina, Candida and Lycoris; the two former had been the objects of a transient flame, and the last, long his faithful companion, had at length forsaken him in declining years; in the fifth he gives the history of a senile passion for a Grecian damsel, and the sixth, which extends to a dozen lines only, is filled with complaints and lamentations called forth by the near approach of death. "I lose the day," says Maximianus, "though death comes not: hemmed in as I am with the blankness of darkness, who can deny that I am in a hell-like place?"

The recurring burden of Maximianus' song is the unhappiness of old age; it is heard in the very first lines:

> Aemula quid cessas finem properare senectus?
> Cur et in hoc fesso corpore tarda venis?
> Solve precor miseram tali de carcere vitam:
> Mors est iam requies, vivere poena mihi.

It interrupts the amatory narrative at intervals throughout, and closes the series of love experiences with the same melancholy note: "Claude precor miseras, aetas verbosa, querellas."

The higher senses, particularly hearing and vision are noteworthy in showing progressive age change; sensations exhibit in old age a gradual diminution of acuity; the mean number of taste-buds in the trench-wall surrounding the papillae drops in early old age and decreases in extreme old age. Since ancient times, probably, impaired hearing has been recognized as one of the common afflictions of the aged. In terms of speed and accuracy of immediate recall, decline does occur with marked impairment of memory, especially for recent events which is commonly observed in extreme old age.

After the vigorous positive growth in youth comes, in the course of time, a gradual negative process of physically conditioned mental decay. The psychological factors of ageing include and depend upon a physiological regression. But there is no critical age line beyond which psychological production ceases; it is the individual personality and not the age that sets the final limit.

Maximianus complains of these deficiencies in the following lines.

Iam minor auditus, gustus minor; ipsa caligant
Lumina: vix tactu noscere certa queo,
Nullus dulcis odor, nulla est iam grata voluptas:
Sensibus expertem quis superesse putet?
En Lethaea meam subeunt oblivia mentem,
Nec confusa sui iam meminisse potest,
Ad nullum consurgit opus, cum corpore languet
Atque intenta suis obstupet illa malis.
Carmina nulla cano: cantandi summa voluptas
Effugit et vocis gratia vera perit.
Non fora sollicito, non blanda poemata fingo,
Litibus haud rabidis commoda iura sequor.

The external appearance of the old man is characteristic: the dry and wrinkled skin, the scanty, grizzled hair, the mouth without teeth, the crooked sunken body. If there is any part of the human body which literally thrusts the evidence of its advancing years upon whomsoever may look, it is the skin. A child knows the significance of wrinkles, grey hair and baldness. Facial contours, complexion and expression can tell the observer a great deal: skin texture, prominence or otherwise of veins and arteries, the colouring of ears, lips and extremities. Much may be learnt from the manner of sitting, standing, moving, breathing and speaking. At the same time as the stature diminishes, the weight of the body lessens. A more or less pronounced emaciation—habitus corporis strictus—is characteristic of ageing. The muscular powers undergo in old age a weakening, as also the functions of the voluntary nervous system; the tremor of the hands, the tendency to stoop. Maximianus described these conditions in the following lines:

Ipsaque me species quondam dilecta reliquit
Et videor formae mortuus esse meae.
Pro niveo rutiloque prius nunc inficit ora
Pallor et exanguis funereusque color.
Aret sicca cutis, rigidi stant undique nervi,
Et lacerant uncae scabrida membra manus.

. . . . . .

Non habitus, non ipse color, non gressus euntis,
Non species eadem quae fuit ante manet.
Labitur ex humeris demisso corpore vestis,
Quaeque brevis fuerat iam modo longa mihi est.
Contrahimur miroque modo decrescimus: ipsa

Diminui nostri corporis ossa putes.
Nec caelum spectare licet, sed prona senectus
Terram, qua genita est et reditura, videt.
Fitque tripes, prorsus quadrupes, ut parvulus infans,
Et per sordentem flebile repit humum.

Among the outstanding features of old age we find also the growing apprehensiveness regarding environmental dangers. In spite of the many notable exceptions to be found among men and women in public life, the popular impression that elderly persons tend to be more conservative, more reactionary, more intolerant of change in manners, morals, religion and politics than are their juniors, is probably correct. The mind that rejects something merely because it is new and rejects it without examination shows one major evidence of senility; almost every discussion is apt to refer to the conservative attitude, to the intellectual rigidity of the older people.[1]

Maximianus refers to those features of old age and especially to the senile garrulity:

Stat dubius tremulusque senex semperque malorum
Credulus, et stultus quae facit ipse timet.
Laudat praeteritos, presentes despicit annos:
Hoc tantum rectum, quod sapit ipse, putat.
Se solum doctum, se judicat esse peritum;
Et, quod sit sapiens desipit inde magis.
Multa, licet nolis, referens eademque revolvens
Horret et alloquium conspuit ipse suum.
Deficit auditor, non deficit ipse loquendo:
O sola fortes garrulitate senes.

Maximianus complains that old age takes from him the pleasure of love, wine and all that cheers life. His description of some physiologic changes of the ageing organism, e. g. of the loss of resistance against atmospheric influences, and of various disorders deserve appreciation.

It is usually the old man who complains most of " feeling the cold." The respiratory functions as a whole are impaired, this being shown by the increase in the number of respirations. Chronic Bronchitis is perhaps the most common of all diseases in the aged.

[1] Praeterea gigni pariter cum corpore, et una
Crescere sentimus, pariterque senescere mentem. (Lucretius, *De Natura Rerum*, III, 445/6.)

Most of the secretions are diminished, especially, those of sweat and urine. The senile dyspepsia depends in a great measure upon the diminution of the gastro-intestinal secretion.

Itchiness qualified beyond doubt as a process in ageing is indeed the most common and conspicuous symptom of senile skins. It is proper to assume that the abnormal dryness of the skin is largely etiologic.

The body, states Maximianus, lies in solitary helplessness, obliged to relieve itself every hour by involuntary dribblings which reduce and waste it. Appliances have no longer their accustomed power, but the drugs he buys are wasted on the body which consumes their substance; the oozing vessels becoming tighter with each successive loss.

Iam poena est totum quod vivimus: urimur aestu,
Officiunt nebulae, frigus et aura nocet.
Ros laedit modicoque etiam corrumpimur imbre
Veris et autumni laedit amoena dies,
Hinc miseros scabies, hinc tussis anhela fatigat:
Continuos gemitus aegra senectus habet.
Hos superesse reor, quibus et spirabilis aer
Et lux, qua regimur, redditur ipsa gravis?
. . . . . .
Iam subeunt morbi, subeunt discrimina mille,
Iam dulces epulae deliciaeque nocent.
Cogimur a gratis animum suspendere rebus
Atque, ut vivamus, vivere destitimus.
Et me quam crudum, quem nulla adversa nocebant,
Ipsa quibus regimur nunc alimenta gravant:
Esse libet saturum: saturum mox esse pigebit,
Praestat ut abstineam: abstinuisse nocet.
Quae modo profuerat, contraria redditur esca:
Fastidita iacet, quae modo dulcis erat,
Non Veneris, non grata mihi sunt munera Bacchi
Nec quicquid vitae fallere damna solet,
Sola iacens natura manet, quae sponte per horas
Solvitur et vitio carpitur ipsa suo.
Non totiens experta mihi medicamina prosunt
Non curis quicquid ferre solebat opem.

Maximianus, in his description of the old man, mentions that the eyebrows with age assume a rough and disorderly appearance: " the eyes have a grim and almost devilish look, as if inclosed in a

cavern." And the poet also gives a proportionally comprehensive description of ocular afflictions of the aged:

Quondam ridentes oculi nunc fonte perenni
Deplangunt poenas nocte dieque suas,
Et quos grata prius ciliorum serta tegebant,
Desuper incumbens hispida silva premit
Ac velut inclusi caeso conduntur in antro:
Torvum nescio quid seu furiale vident.
Iam pavor est vidisse senem, nec credere possis
Hunc hominem, humana qui ratione caret,
Si libros repeto, duplex si littera findit,
Largior occurrit pagina nota mihi.
Claram per nebulas videor mihi cernere lucem:
Nubila sunt oculis ipsa serena meis
Eripitur sine morte dies: caligine caeca
Septum tartareo quis neget esse loco?

And last but not least, Maximianus characterizes very figuratively the old man's inclination to early waking and his vexations by the interruption of sleep.

Ipsa etiam cunctis requies gratissima somnus
Avolat et sera vix mihi nocte redit,
Vel si lassatos umquam dignabitur artus,
Turbidus in quantis horret imaginibus!
Mollia fulcra tori duris sunt cautibus aequa
Parva licet magnum pallia pondus habent,
Cogor per mediam turbatus surgere noctem
Multaque, ne patiar deteriora, pati.

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M. Pierce Rucker, Medical Arts Building, Richmond, Va.
Josiah C. Trent, 1015 Demerius St., Durham, N. C.
Phillip Jordan, University of Minnesota, Minneapolis, Minn.

CONSTITUENT SOCIETIES

The Beaumont Medical Club, New Haven, Conn.

The thirteenth William H. Carmalt Lecture will be given by Dr. E. B. Krumbhaar of Philadelphia on Friday, February 7, 1947 in the Historical Library, Sterling Hall of Medicine. The subject of Dr. Krumbhaar's address will be "The State of Pathology in the British Colonies of the Atlantic Coast in the 17th and 18th Centuries."

Boston Medical History Club

The Boston Medical History Club will hold its third meeting of the year on February 24 at the Boston Medical Library. Dr. George Kelemen will speak on "A Medical Journey to Latin America."

The Johns Hopkins Institute of the History of Medicine

Dr. Henry E. Sigerist has resigned as William H. Welch professor of the history of medicine and director of the Institute because he found it increasingly difficult to reconcile his research work and writing with steadily growing general academic and administrative duties. The resignation has been accepted as of June 30, 1947 when he will return to Switzerland, where he intends to devote his entire time to the writing of a comprehensive *History of Medicine*, that the Oxford University Press will publish in 8 volumes.

The Johns Hopkins Medical History Club, Baltimore, Md.

The second meeting of the year was held on Monday, January 27, 1947 in the Lecture Hall of the Institute of the History of Medicine. Dr. Jane M. Oppenheimer of Bryn Mawr College spoke on "John Hunter and the Experimental Method."

NATIONAL NEWS

Brown University, Providence, R. I.

Announcement has been made of the establishment of a new department at Brown University to be known as the Graduate Department of the History of Mathematics. It will be under the leadership of Dr. Otto Neugebauer, professor of the History of Mathematics. Associated with him as a key member of the staff will be Dr. A. J. Sachs, who was promoted to the rank of assistant professor of the History of Mathematics on Jan. 1, 1947.

The principal research objectives of the new department will be the study of ancient astronomy in its relations to mathematical disciplines and to the history of civilization. Entailed in this study is extensive description and interpretative work covering Babylonian, Egyptian, and Sanskrit material, as well as data pertaining to Greek astronomy and astrology and ancient chronology in general.

From the standpoint of instruction, a course in Oriental History, open to both graduate and undergraduate students, to be taught by Professor Sachs, is planned for the academic year 1947-48. It is also expected that a seminar on selected topics in ancient astronomy and mathematics will be offered in cooperation with the departments of mathematics, astronomy and classics.

The John Shaw Billings Club, Cleveland, Ohio

The *Army Medical News* tells of a recent meeting of the John Shaw Billings Club on Tuesday, January 14, 1947 in the Allen Memorial Library, Cleveland, Ohio. This club was organized in March 1944 by a group of Cleveland physicians who were interested in becoming acquainted with the Army Medical Library's large collection of rare and early medical works temporarily housed in the Allen Memorial Library Building. At this last meeting Mr. Francis Sommer, special Consultant in Oriental languages, gave a talk on the Library's Oriental manuscripts which now include 94 Arabic, 29 Persian, 9 Turkish, 4 Singhalese, and 1 Hebrew manuscript. Dr. Howard Dittrick, Honorary Consultant to the Army Medical Library, was elected Chairman of the Club for the coming year.

The New York Academy of Medicine

In celebration of the 100th anniversary of the founding of the New York Academy of Medicine an extensive program of meetings has been arranged. The Centennial Dinner on March 6, 1947 will open the celebration and be followed by 24 meetings on various dates between March 11 and April 25 which will include an Institute on Library Methods and Problems, an Institute on Social Medicine, an Institute on Public Health, an Institute on Medical Education, and an Institute on Hospitals, in addition to meetings of the

various sections of the Academy and affiliated societies. A very interesting brochure by Dr. Iago Galdston, *A Century of The New York Academy of Medicine 1847-1947*, highlights the activities of the Academy during the first century of its existence.

Biography of Benjamin Silliman

Dr. John F. Fulton of Yale University, whose life of Harvey Cushing has recently been published, is working on a biography of Benjamin Silliman, the great 19th century American scientist and founder of the Sheffield Scientific School at Yale University. Henry Schuman will publish the book this year, the centenary of the School's founding, as a volume in the firm's "Life of Science Library."

NEWS FROM ABROAD

Brazil

On June 5, 1946 a new institute of the history of medicine was founded at Pôrto Alegre, Instituto Sul-Riograndense de Historia da Medicina, which is dedicated to the study of medical history in general and its allied sciences. Its first President is Dr. Tasso Vieira de Faria. Plans are under way to establish a library, archives and a museum of medical history, and the first volume of *Anais do Instituto Sul-Riograndense de Historia da Medicina* is scheduled to appear in 1947.

GEORGES CONTENAU. *La Médecine en Assyrie et Babylonie.* Paris: Librairie Maloine, 1938. 227 pp., 60 ill., 1 map.

Though this book was published in 1938 it still seems necessary to announce it briefly at least. The war having intervened, it seems that only a few medical historians have heard of this survey of ancient Mesopotamian medicine. Yet, to my knowledge such a survey does not exist in any other language, and is highly valuable for everybody who wants to have at least a short and reliable impression of medicine in ancient Mesopotamia. The author being an M. D. and simultaneously curator of Oriental antiquities in the Louvre Museum was particularly qualified for writing such a book.

He begins with an excellent general introduction on the different Mesopotamian civilizations, using archaelogical as well as the most recent anthropological materials. In the field of medicine proper he discusses first the different forms of professional healers, and the rudimentary anatomical and physiological knowledge of the ancient Mesopotamians.

He then analyses in detail the three main characteristics of this chapter in the history of medicine: the sin theory of disease, the particular forms of "diagnosing" disease, and the empirical or rational (naturalistic) elements of this primarily religious medicine. Methods of divination are studied in great detail, since what little diagnosis and prognosis the Mesopotamians had, were most strongly colored by their obsession with divination. The only point where I would disagree with the author is when he assimilates the meager rational elements in Mesopotamian medicine to Hippocratic medicine. This seems to me quite an overstatement. It is regrettable that the author does not say more about Mesopotamian science (astronomy, technology). While Mesopotamian medicine, at least the part which has been transmitted to us, seems inferior to e. g. Egyptian medicine, I feel that Mesopotamian civilization as a whole makes a far better showing, not the least in the general field of science.

ERWIN H. ACKERKNECHT

HARRY FRIEDENWALD. *Jewish Luminaries in Medical History, and a Catalogue of Works Bearing on the Subject of the Jews and Medicine from the Private Library of Harry Friedenwald.* Baltimore: Johns Hopkins Press, 1946. viii + 199 pp. 3 ill. $3.00.

Dr. Harry Friedenwald's most recent contribution to the history of medicine consists of two distinct parts, an essay entitled *Jewish Luminaries in Medical History* and a long impressive *Catalogue* of his private library of medical

Judaica. These two components are issued in one volume, with a brief preface by Dr. Sigerist. Publication evidently was delayed by the war, since Dr. Sigerist's preface is dated February 10, 1943, while the title-page of the book is dated 1946. The Catalogue contains at least two entries as recent as 1944.

The essay, Jewish Luminaries in Medical History, was originally delivered as an address at Johns Hopkins University. The published version runs to twenty-four pages. It is not—and is not intended to be—a complete treatise on Jewish contributions to medicine. As the title suggests, the author has selected a few interesting or conspicuous historical figures and has given a concise account of each. The personages selected represent the principal periods of history from Asaph Judaeus, author of the earliest extant Hebrew medical manuscript, to Paul Ehrlich, whose most famous work was done in the present century.

This technique of historical sampling is not devoid of merit. For casual readers and other persons not specially acquainted with the field it provides an adequate general impression, while an occasional traveller in realms of gold may be impelled toward further study along systematic lines. The materials for such study are presented, in generous measure, in the *Catalogue*.

As representatives of the contact between Moslem and Jewish medicine Dr. Friedenwald has appropriately chosen Isaac Judaeus, Maimonides, and the translators. Hebrew astrology and astronomy are noticed briefly. The Renaissance is exemplified by Francisco Lopez de Villalobos, noted for his poem on syphilis (1489), and by Amatus Lusitanus, Mantino, and Garcia da Orta. An interesting seventeenth-century figure is Felipe Montalto, whose treatise on neuropsychiatry, the *Archipathologia*, rests in unjust oblivion. Other notable physicians of the era were Zacutus Lusitanus and Rodrigo de Castro. The choice of these men as prototypes is a reflection of Dr. Friedenwald's interest in the Jewish physicians of Mediterranean and especially Marrano background.

The annotated *Catalogue* sets forth the result of a half-century of diligent and enlightened collecting. In it the reader encounters, with mounting admiration and astonishment, not only the works of Maimonides, Isaac Judaeus, the Lusitani, and the Abravanels, but also astrological manuscripts of Donnolo and Mashallah, part of the Canon of Avicenna in Arabic (written in Hebrew cursive transcription), three Hebrew versions of parts of the Canon, manuscript works by Constantinus Africanus, and other treasures too numerous to mention and almost too precious to believe. These rarities are accompanied by a complete train of secondary works, commentaries, books of reference, and the like. The entries contain adequate detail and are amplified by occasional explanatory notes.

The book is clearly printed, the format being in all respects a worthy counterpart of the content.

SAUL JARCHO

JANE M. OPPENHEIMER. *New Aspects of John and William Hunter.* New York: Henry Schuman, 1946. xx + 188 pp. 5 ill. $6.00.

It is sometimes assumed that everything has been said about John Hunter already. Lately however there have been several attempts to go behind the collected *Works* and the official *Life*, published forty years after his death, and to see him as he appeared to his contemporaries. The newest and best of these essays of reconnaissance, for they are not yet complete enough to form a full revaluation, are those by Miss Jane Oppenheimer of Bryn Mawr, who is exploring the relations of the two Hunters, John and the elder brother William whose fame he so largely eclipsed, with the distinguished men of their age both lay and medical. Her discoveries are valuable additions to knowledge, even if her conclusions are not all acceptable. This beautiful little book, produced with a distinction of style worthy of its careful scholarship, consists of two studies: first, a critical biography of Everard Home, John's assistant, brother-in-law and executor; and second, an account of William's friendships and quarrels with the great people of the court, politics and literature. It is a painstaking and thoughtful piece of work, which no one interested in either of the Hunters may ignore, and it has a discriminating preface by Dr. Fenwick Beekman of New York, who knows more about the Hunters than anyone living except Sir Arthur Keith.

The first essay is controversial, for Miss Oppenheimer attempts an open-eyed defence of Everard Home, who since the night in 1823 when he burned John Hunter's papers has been generally written off as a scoundrel. Her analysis suggests that his rash act was due to genuine belief that he had completed Hunter's work by using Hunter's notes in his own voluminous publications. But the question remains whether such a conceited motive is a valid excuse for the betrayal of trust, usually attributed to the guilty conscience of a plagiarist. Miss Oppenheimer has no difficulty in showing that Home was a worthy, industrious pupil of John Hunter, a sound surgeon and a good comparative anatomist. He became one of the leading practitioners in London in an age of great surgeons, was a prominent Fellow of the Royal Society and a frequent writer in the *Philosophical Transactions*; his papers are indeed so good that his traducers say they are really Hunter's work. Miss Oppenheimer provides a short-title bibliography of Home, which is very welcome. Home was also responsible for the reconstitution of Hunter's museum, which made possible its great development in the next generation. All this sound, if uninspired, work has been hidden behind his destruction of the manuscripts. Rehabilitation of his character turns on the value of the manuscripts and on the good faith of those who succeeded in putting their denigration of Home across. What has Miss Oppenheimer to say that is new on these two points? She surveys contemporary opinions of Home's foolish act and examines the personal relationship of Home and William Clift. In spite of Benjamin Brodie's statement (p. 42) that he had

seen "Hunter's rough notes" in Home's possession, which "were not such as could be used with much advantage by another person," Miss Oppenheimer does not explain away the wealth of Hunter's manuscripts as a whole collection, which may be judged from the great interest and value of the surviving fragments edited by Richard Owen. She elaborates and accepts the excuses which Home based on Hunter's known reluctance to publish unfinished work; but she does not distinguish sufficiently between an author's justifiable dissatisfaction with his own incomplete notes and the respect which his successor ought to have shown for the integrity of the same notes after his death.

As to the good faith of Home's detractors Miss Oppenheimer tries to show that William Clift, Hunter's last secretary and the curator of his museum, nursed a grudge against Home who had long treated him as a servant. She speaks of "his inward jealousy of Hunter's honour and outward envy of Everard's worldly position." I believe that her reading of Clift is wrong. She does not give weight enough to his abilities as a scientist; for he had made himself an excellent comparative anatomist, well qualified to judge Home's claims and conscious that Home did not appreciate his attainments as artist and scientist. Clift knew too that while Home had been the moving spirit in the preservation of Hunter's museum, and had advertised the fact to his own advantage, he himself had done all the real work in the Museum for thirty years and kept Hunter's scientific achievements alive. He was appreciated by such shrewd judges as Matthew Baillie and John Abernethy. His jealousy for Hunter was open and based on sound knowledge, and he had no envy of worldly success.

After careful consideration of her arguments and of her whole life of Home, I still find his undoubted ability and industry offset by obtuseness and self-conceit.

The second essay, on William Hunter, brings together from a wide reading of eighteenth-century memoirs and letters many personal details of Hunter's relations with the King and Queen, with David Hume and Horace Walpole and numerous other leading personalities. Above their immediate interest they are valuable because they show that Hunter's ordinary social contacts were marred by the same touchiness and twists of character which are well-known from his professional quarrels with the Monros, with Pott, and with his own brother John. These have been dismissed as customary in his time; Miss Oppenheimer shows that they arose from William's nature.

W. R. LeFanu

Pierre Vallery-Radot. *La Faculté de Médecine de Paris. Ses origines, ses richesses artistiques.* Paris: Masson et cie., 1944. 85 pp., 26 ill.

This charming little book, delightfully illustrated, gives a rapid survey of one of the most important chapters in medical history. The author tells us

his story in following up the fate of the buildings which harbored the medical and surgical schools of Paris since 1369. It might be symbolical for the evolution of medicine in Paris that the buildings, originally destined for the teaching of surgery, have survived best, and form the nucleus of the present faculty. Up to the 19th century, Paris surgery proved to be far more vital and fertile than medicine which was so badly hampered by scholastic traditions. The little book will be a welcome source of information for all those who have not enough time to study the very detailed, classic studies of Corlieu, Chereau, etc. It will also be an excellent guide for all those who plan a pilgrimage to the medico-historical monuments of Paris.

ERWIN H. ACKERKNECHT

HENRI MONDOR. *Pasteur.* Paris: Editions Correa, 1945. 189 pp., 10 ill.

The author modestly calls this short survey of Pasteur's life a "hommage de chirurgien" at the occasion of the fiftieth anniversary of Pasteur's death. But Dr. Mondor is not only an eminent surgeon, he is also an outstanding writer, and the book is far more than an old story delightfully retold. In the past in descriptions of Pasteur's life his sense of detail and his great human kindness were emphasized above all other traits of his character. Dr. Mondor wants us now to remember rather the constant fascination with the fundamental problem of life in Pasteur, his passionate temperament and his enormous energy in fighting for what he had once discovered to be the truth. In view of the extreme conservatism of the French clinicians of his time, Pasteur needed more than plenty of the latter qualities. This reinterpretation, obviously influenced by the general political experiences in France during the last decade, makes worthwhile reading. Some little known and most significant portraits of Pasteur among the illustrations deserve special mention.

ERWIN H. ACKERKNECHT

HAMILTON BAILEY and W. J. BISHOP. *Notable Names in Medicine and Surgery. Short Biographies of some of those whose discoveries (not necessarily the greatest medical discoveries) have become eponymous in the medical and allied professions.* London: H. K. Lewis, 1946. Second Edition. 202 pp. 238 Portr. and Illustr.

This "First-Aid" for the multitudes of practitioners who need and the few who want historical-medical information is certainly a very useful and pleasant book. Its limitations are amply expressed in the title, and nobody can expect to find on 200 pages in 12° anything complete or satisfactory for everyone. The selection presented is of necessity subjective, largely dependent upon the personal taste of the authors, all the more as by no means the

greatest medical discoverers have been chosen. It is the names that have "received perpetuation by their being in almost daily use" which are intended, with a short biography, a specimen of the pathological changes, operative procedures, appliances or instruments known under the name and a picture of the place (hospital, clinic) where the "heros eponymos" lived and worked. With this aim of the authors and so little space available one might ask why anatomists like Wharton and Stensen are represented while the great describer of the liver capsule is only just mentioned as Wharton's personal friend, although there is every reason to believe that historical justice will be done and also the sphincter at the duodenal ampulla eventually named after its real discoverer: Francis Glisson. On the whole, it would be out of place to argue on such lines, but a few suggestions may be pertinent. The few "Aphorisms" quoted give a good picture of Hippocratic Medicine and should be supplemented by a few similar sentences from the classical Hippocratic case-reports. The statement that Galen "came very near to discovering the circulation of the blood" is at least debatable. The frontispiece to Vesal's "Fabrica" would well replace a Victorian picture purporting to depict Vesalius demonstrating Anatomy. Bright's original picture of a contracted kidney testifies to the accuracy and beauty of the old illustrations as against the modern text-book pictures which impress the reader of a historical book as "foreign-bodies." The modern building of the Tuebingen Surgical Clinic (1936) hardly fits in with the biography of Ludwig who described "Ludwig's Angina" in 1836, nor had the other surgeons at this place who deserve mention, notably Perthes, anything to do with it.—Most pictures in the book, however, are well chosen, particularly those of the instruments which give the old pattern or the original specimens. The glimpses provided of XIXth century Harley Street (Southey), of Thomas' House at Liverpool, of the Hôpital Necker (Potain), the Massachusetts General Hospital (Bigelow), of Bart's (Paget), the State Hospital for Women, New York (Sims), the Edinburgh Royal Infirmary (Syme), the London Hospital in 1759 (Scott), of Guy's in 1875 (Bright), of the Hôpital St. Louis in the XVIIth century (Lugol and the historical aspects of Scrofulosis), the Anatomy at Gt. Windmill Street in 1783 (Brodie), the Middlesex in 1835 (Bell), the Hospital of Santa Maria Nuova at Florence (Banti) etc.—all these pictures strike the right historical note giving an idea of the period and its cultural background.

WALTER PAGEL.

S. VERE PEARSON. *Men, Medicine and Myself.* London: Museum Press Ltd., 1946. Cloth. With Portr. 12/6 sh.

The value of autobiographies as sources of Medical History has been rightly contested, as they tend to be anecdotal. When, however, as in the

present book, the anecdotes are related by a medical pioneer keenly alive to the "March of Medicine" and its economic and sociological implications during the last fifty years, the string of anecdotes will reveal undercurrents of development, unknown to official Medical Historiography and invaluable to the Medical Historian. The latter wishing to include the future of medicine in the historical syllabus, will be also attracted by a number of "systematic" and "programmatic" chapters which lucidly put and greatly further such problems as the Psychological Factor in Disease, notably in Tuberculosis, Rehabilitation, Civilisation and Health, Medical Education, Health-Centres and State-Medicine. The author, the English veteran fighter against tuberculosis, has to his credit the importation of collapse-therapy into Great-Britain which he relates as follows: "Lillingstone had been taken ill on his honeymoon in Norway some three years previously. After lying in bed for the best part of two years, his sanatorium physician had to break it to him that his outlook was very gloomy. 'But,' said he, 'there is a new form of treatment I've not yet adopted which I consider suitable for you . . . here's a lot of literature about it . . .' After reading the literature L. consented; a successful pneumo-thorax was induced and he soon began to mend. He came more or less straight from Norway to Mundesley, but had given himself, with the help of his wife, the first refill since leaving Norway . . . I gave him the next refill and immediately suggested a form of apparatus with two movable bottles so that siphonage between them could be used to expel the air into the thorax by a simple, visible, steady and controllable plan which I considered superior to the then Continental type of apparatus with two fixed cylinders and a hand bellows. Thus arose with the help of our carpenter, and, if I remember rightly, in the first instance an empty whisky bottle, the first 'Lillingstone and Pearson' apparatus, now residing in a loft, but still capable of useful work. I chose a suitable patient for the first induction in England, and Lillingstone, with some trepidation and much awe on my part, did the deed. The picturesque and dramatic account of the first induction of a pneumothorax in England in Cronin's 'Citadel' is, of course, quite fictitious; and there is a good deal of fiction in the amusing, well written story by Lillingstone published in 'Blackwood's Magazine' about 1935." This happened about 1910. Let us contrast it with another of Pearson's "stories" going back to his "apprenticeship" at the Brompton Hospital in the very first year of this century: "When I was a house-physician at the Brompton, ideas of chemical cure were crude. It was thought possible to squirt into the patient's blood some solution which would prove inimical to the tubercle bacillus, but harmless to the patient's tissues. There was one keen physician attached to the St Mary's and Brompton Hospitals, Dr Robert McGuire, who experimented on himself with such a solution, formaldehyde. The dosage he had administered to himself gave him acute inflammation of the kidneys and he nearly died. He tried it weaker, and other doctors followed his lead. Many

a pint of weak formaldehyde have I run into patients' veins at the bend of the elbow out of a burette. But it never did any good. At St George's my physician, William Ewart, thought he would go one better than McGuire and chose a solution of silver salt. When I asked him once the rationale of the treatment all I got out of him was: 'Well, Pearson, you see this silver salt stains the interstitial tissues of the lungs brown.'" Here, then, is the "march of medicine" from crude "Chemotherapy" to Collapse therapy and—at present—back again to Chemotherapy on a higher level. There were other courageous pieces of pioneer-work: Pearson was the first to take direct manometric readings from a tuberculous cavity. Guided by the impression that persistent high pressure in a cavity accounts for its failure to respond to treatment, he confirmed this by inserting a needle into the actual cavity—a procedure then regarded as highly dangerous and never performed, but to-day not more than an item on the routine agenda in collapse therapy. Pearson thereby discovered what is now called "Tension-Cavity" and provided the basic facts leading up to subsequent research by the late Professor Coryllos of New York into the decisive role of the draining bronchus (notably its occlusion) in cavity healing. Pearson's original ideas and researches extended into fields as far remote from orthodox medicine as agriculture, town planning, the causes of overcrowding and its remedies, architecture and others. In order to ensure for his patients a reliable supply of fresh eggs he scientifically studied poultry farming for three months, devising an electrically worked brooder, probably the first used in England. He designed the "Mundesley-Window" which permits a bed-patient to see as wide a view of the outside world as possible. Such, then, is the life of a pioneer who lived and made medical history, a benefactor to mankind, a charming colleague inclined to give too much praise to some of his contemporaries while modestly hiding his own much greater achievements. It will be read with joy, satisfaction and admiration by wide circles, professional as well as laymen, especially in the United States which he studied on several visits, exchanging views with some of the great American Doctors and Economists.

WALTER PAGEL.

R. SCOTT STEVENSON. *Morell Mackenzie. The Story of a Victorian Tragedy.* London: Heinemann. 1946. viii + 194 pp. 18 illustr. Cloth. 15/-

The two-fold "Victorian Tragedy" of the German Emperor Frederick III and his doctor Sir Morell Mackenzie is well told in this book by a colleague of the latter who spent much of his spare time during the last twenty years sifting and weighing the chequered sources in the light of modern medical knowledge. From a hotbed of professional and court intrigue fomented by nationalist sentiment, Mackenzie arises as one of the founders of scientific Laryngology, the author of the leading textbooks of the time, the generous,

gentle and skillful consultant of Victorian society—liable, however, to a yearning for publicity and fame, being "a great man, but . . . a bit of a humbug as well." The present author attributes the appearance of Mackenzie "vacillating in the conduct of his case" to the atypical features of the lesion when first seen by him, features which, the author suggests, might well have aroused the suspicion of syphilitic origin, at a time when syphilis was rife and its diagnosis largely made "ex juvantibus," although, no doubt, laryngeal carcinoma was the condition in the end. Mackenzie rightly and in advance of his time insisted on a biopsy which, on two occasions proved inconclusive though submitted to Virchow himself who, as late as a fortnight before the death of the patient, expressed an optimistic view of the case based on purely clinical and second hand impression. It appears to be one of the many morals of the story that "Professor Virchow—because he was a German, although a keen political opponent of Bismarck—never shared the obliquy of Mackenzie after the Emperor's death, and indeed in 1890 was elected President of the International Congress of Medicine at Berlin." (p. 168). It should be remembered, however, that at this time surgical diagnosis by histological examination was in its infancy which explains that, before Mackenzie was called in by the Medical Junta in charge of the Imperial patient, the diagnosis of Cancer had been arrived at without biopsy and preparations made for the then very dangerous operation of laryngofissure or, if necessary, laryngectomy. Obviously, therefore, the clinician, not the pathologist, was likely to be made responsible for a wrong diagnosis in these days when biopsy-material was neither fixed nor stained and sectioned properly, and consequently early, scanty or doubtful carcinomatous structures were bound to be overlooked. More detail as to the histological pictures obtained by Virchow (and later on by others) and their reproduction (if possible) would certainly be of great interest for medical history—the reports given sounding to the present day pathologist quite uncommittal, involved and inconclusive. It should be also recalled that as late as 1871, Virchow had expressed his doubts as to the origin of cancer in epithelium and regarded the stroma as its matrix at least in a number of cancerous growths (*Cellularpathologie*, 4th Edit., Berlin 1871, p. 552, 555, 569).—The present author's summing up appears to be well balanced: "If in 1887 Morell Mackenzie had diagnosed the case of the Crown Prince as cancer of the larynx and had then expressed the view that the operation urged by the German surgeons and physicians was unjustifiable on account of the undoubted risk to life, and that conservative treatment and careful nursing would prevent suffering and prolong life—Henry Butlin stated in 1883 that when tracheotomy was performed in cancer of the larynx life was prolonged in some cases for eighteen months or two years—his position would have been unassailable.." (p. 173.) Mackenzie, the champion of the new speciality of Laryngology, laying himself open to misunderstanding and misrepresentation by general medical and

surgical advocates of the old ways, earned the hatred of his colleagues both abroad and at home, but retained the confidence and affection of his patient, the Empress and the Royal Family to the very end. In history he "will be remembered—as indeed he would have preferred to be remembered—as the chivalrous physician who, single-handed and in the face of overwhelming opposition and intrigue, by his determined intervention prolonged the life and effected the accession of an emperor." (p. 181.)—The well written book is pregnant with lessons for the present day reader, medical or not. Above all it vividly illustrates the destructive effect of advertising on the one hand and narrow-mindedness and nationalism on the other where scientific truth is at stake.

WALTER PAGEL.

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